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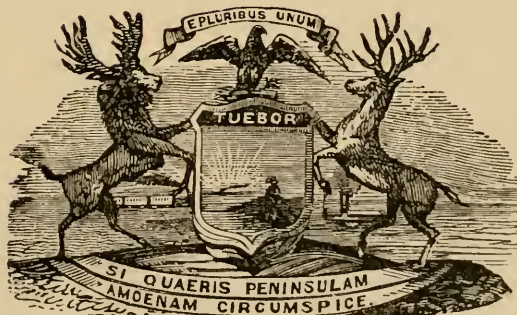
A. B. Prescott.

1878.



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FIFTH ANNUAL REPORT
OF THE
SECRETARY
OF THE
STATE BOARD OF HEALTH
OF THE
STATE OF MICHIGAN,
FOR THE
FISCAL YEAR ENDING SEPT. 30, 1877.



BY AUTHORITY.

LANSING:
W. S. GEORGE & CO., STATE PRINTERS AND BINDERS.
1878.

Office of the Secretary of the State Board of Health, }
Lansing, Michigan, December, 1877. }

TO HON. CHARLES M. CROSWELL, *Governor of Michigan:*

SIR:—In compliance with the laws of this State, I present to you the accompanying Report for the fiscal year ending September 30, 1877.

Very respectfully,

HENRY B. BAKER,

Secretary of the State Board of Health.

EXCHANGE U. OF M. QUERULANT

DEC 5 '78
Miss. Hist. Soc.

RESOLUTION OF THE BOARD RELATIVE TO PAPERS PUBLISHED IN
ITS ANNUAL REPORT.

Resolved, That no papers shall be published in the Annual Report of this Board except such as are ordered or approved for purposes of such publication by a majority of the members of the Board; and that any such paper shall be published over the signature of the writer, who is entitled to the credit of its production, as well as responsible for the statements of facts and opinions expressed therein.

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REPORT.

This is the Fifth Annual Report of the Secretary of the Michigan State Board of Health, and is for the fiscal year ending September 30, 1877. In addition to the report of the work of the office of the Board, special reports, communications, etc., prepared by the Secretary, it contains nineteen papers upon different Sanitary subjects. Thirteen of these were mostly written by members of the Board, two of the thirteen are partially, and the six others largely, made up of valuable material contributed by the regular correspondents of this Board.

Inasmuch as the article on Weekly Reports of Diseases during this fiscal year is a comparatively new feature in these Reports, it may be proper to ask attention thereto. The amount of work required to make the compilation has been even greater than was anticipated, but it is hoped that the value of the article will more than compensate therefor. The Registration of Disease has for some time been considered very desirable; but, although several times attempted in different parts of the world, has never been successfully practiced for any considerable time. It remains to be seen what the result of this attempt will be. Thus far the undertaking promises grand results.

Excepting the first part of the Report which is paged in Roman numerals, the papers are published under the same resolution that has governed the subject in previous Reports, and which is reprinted here because it states definitely the conditions of their publication:

“Resolved, That no papers shall be published in the Annual Report of this Board except such as are ordered or approved for purposes of such publication by a majority of the members of the Board; and that any such paper shall be published over the signature of the writer, who is entitled to the credit of its production, as well as responsible for the statements of facts and opinions expressed therein.”

MEMBERS OF THE STATE BOARD OF HEALTH.

At the close of the fiscal year, the names and postoffice addresses of the members of this Board are as follows:

ROBERT C. KEDZIE, M. D., President,	Agr'l College, Lansing.
HOMER O. HITCHCOCK, M. D.,	Kalamazoo.
HENRY F. LYSTER, M. D.,	Detroit.
REV. CHARLES H. BRIGHAM,	Ann Arbor.
HON. LEROY PARKER,	Flint.
REV. D. C. JACOBS, D. D.,	Pontiac.
HENRY B. BAKER, M. D., Secretary of the Board, and Supt. of Vital Statistics,	Office at Lansing.

*
STANDING COMMITTEES.

In order to facilitate its work, the Board has assigned certain lines of work especially to particular members, constituting them standing committees on their respective subjects. This is not intended to limit any member to the subjects especially assigned to him, or to prohibit any other member from work upon the same subject. Each of these standing committees consists of one member. The numbers, subjects, and names of members of these regular committees are now as follows:

1. Epidemic, Endemic, and Contagious Diseases—Homer O. Hitchcock, M. D.
2. Sewerage and Drainage—Henry F. Lyster, M. D.
3. Food, Drinks, and Water-Supply—Robert C. Kedzie, M. D.
4. Buildings, Public and Private, including Ventilation, Heating, etc.—Rev. D. C. Jacokes.
5. Climate as Relates to Age of Inhabitants—Henry F. Lyster, M. D.
6. Disposal of Excreta and Decomposing Organic Matter—Homer O. Hitchcock, M. D.
7. Poisons, Explosives, Chemicals, Accidents, and Special Sources of Danger to Life and Health—Robert C. Kedzie, M. D.
8. Occupations and Recreations—Rev. C. H. Brigham.
9. Education, the Relation of Schools to Health, etc.—Rev. D. C. Jacokes.
10. Geology, Topography, Influence of Vegetation on Health, etc.—Rev. C. H. Brigham.
11. Death-Rate, as influenced by Age, Climate, and Social Condition—Henry B. Baker, M. D.
12. Legislation in the Interests of Public Health.—Hon. LeRoy Parker.
13. Finances of the Board—Hon. LeRoy Parker.
14. Mental Hygiene—Homer O. Hitchcock, M. D.

BY-LAWS OF THE MICHIGAN STATE BOARD OF HEALTH.

ARTICLE I.—MEETINGS OF THE BOARD.

SECTION 1. The regular meetings of the Board shall be held at Lansing, in the office of the Secretary of State, on the second Tuesdays of January, April, July, and October in each year, at nine o'clock A. M.; and the meeting in April shall be the annual meeting.

SEC. 2. Special meetings of the Board may be called at any time and place by the President. The President shall also call special meetings of the Board on the written request of a majority of the members of the Board, by giving a proper and sufficient notice of the time, place, and object of the meeting to all the members of the Board.

ARTICLE II.—OFFICERS.

SECTION 1. The President of the Board shall hold his office for two years, and until a successor is elected. The election shall take place at the annual meeting of the Board in each alternate year, beginning with 1875.

SEC. 2. In the absence of the President, a President *pro tem.* may be chosen by the members present at any meeting of the Board.

SEC. 3. The duties of the President and Secretary shall be those specified in the law, in these by-laws, and those usually performed by such officers.

SEC. 4. At the meeting of the Board in April in each year, it shall be the duty of the President to present his annual address.

SEC. 5. At the October meeting in each year, the Secretary shall make to the Board a written report for the fiscal year, which report shall include a true account of the nature and amount of property belonging to the Board, which has been received, issued, expended, and destroyed since the last report, and of the property remaining on hand, and also in whose care each item of property is intrusted.

SEC. 6. The Secretary shall receive a salary of two thousand dollars per annum.

ARTICLE III.—COMMITTEES.

SECTION 1. Standing Committees shall be appointed on the following subjects:

1. Epidemic, Endemic, and Contagious Diseases.
2. Sewerage and Drainage.
3. Food, Drinks, and Water-Supply.
4. Buildings—Public and Private; including Ventilation, Heating, etc.
5. Climate—General and by Season of Year; and as related to Age of Inhabitants.
6. Disposal of Excreta and Decomposing Organic Matter.
7. Poisons, Explosives, Chemicals, Accidents, and Special Sources of Danger to Life and Health.
8. Occupations and Recreations.
9. Education: the Relation of Schools to Health, the kind and methods of instruction in use, and methods to be proposed.
10. Geology and Topography: Influence on health, of Forests and their removal, Shade Trees near Dwellings, etc.
11. The Death-Rate as influenced by Age, Climate, and Social Condition.
12. Legislation in the Interests of Public Health.
13. Finance.
14. Mental Hygiene.

SEC. 2. Standing committees shall consist of one member.

SEC. 3. At the first meeting of the Board and at the meeting in April in each alternate year thereafter, the chairman of each standing committee shall be nominated by the incoming President and confirmed by the Board, unless otherwise provided by a majority vote of the members present at such annual meeting.

SEC. 4. Special committees may be appointed at any time by the Board, or by the President of the Board.

SEC. 5. Each committee may employ assistance, but only with the consent of the Board where the expenditure of money is required.

SEC. 6. All papers for the Annual Report shall be in the hands of the Secretary on or before the day of the October meeting in each year.

ARTICLE IV.—SUPPLIES AND EXPENDITURES.

SECTION 1. No unusual expenditures shall be ordered except by a majority of the members of the Board, and then only at a regular meeting, or at a special meeting called to consider the subject of the unusual expenditure.

SEC. 2. Orders for stationery, postage, and other supplies for the use of

members, and for the office of the Secretary, shall be executed by the Secretary, who shall, at the first subsequent regular meeting, present to the Board bills or accounts therefor to be audited.

ARTICLE V.—ORDER OF BUSINESS.

SECTION 1. The order of business at regular meetings shall be as follows :

1. Calling the roll.
2. Reading of minutes of last meeting.
3. Reports of standing committees.
4. Reports of special committees.
5. Communications by the President.
6. Communications by the Secretary.
7. Communications by members of the Board.
8. Introduction of new business.
9. Auditing bills and accounts.
10. Miscellaneous business.

At the annual meeting, the President's address shall follow the reading of the minutes; and at each alternate annual meeting, the election of President shall follow the President's address.

SEC. 2. At special meetings the same order shall obtain as at regular meetings, except that the consideration of the special subject for which the meeting is called may precede the usual order.

SEC. 3. When not conflicting with established rules of the Board, the rules of the Senate of Michigan shall apply to the action of this Board, so far as they are applicable. Points of order for the settlement of which no other provision is made shall be decided by the usual rules of parliamentary practice.

SEC. 4. The order of business may be suspended at any meeting by a majority vote of the members present.

ARTICLE VI.—AMENDMENTS.

SECTION 1. These by-laws may be amended or repealed at any regular meeting of the Board by a majority vote of the members of the Board.

GENERAL RESOLUTIONS.

Resolved, That the chairman of each committee be and is hereby authorized to procure, through the Secretary of the Board, such circulars pertaining to his committee,—not exceeding in each instance five hundred copies,—together with the envelopes and postage stamps necessary to convey the same; and that on presentation of proper vouchers such accounts will be allowed by the Board.

Resolved, That no papers shall be published in the Annual Report of this Board except such as are ordered or approved for purposes of such publication by a majority of the members of the Board; and that any such paper shall be published over the signature of the writer, who is entitled to the credit of its production, as well as responsible for the statements of facts and opinions expressed therein.

The Secretary is directed to communicate to every person asked to prepare a paper for this Board, a copy of the above resolution relative to the publication of papers in the Annual Report.

WORK OF THE OFFICE.

In accordance with custom, a report of the principal items of work in the office of the Secretary during each quarter has been presented at the regular meetings of the Board. At one of the meetings, on the suggestion of Rev. D. C. JACOES, a resolution was adopted directing the Secretary to prepare a report of the main items of work done in his office during the year, and to publish the same in his Annual Report.

In order fully to explain the work of the year, it will be necessary to show how these efforts have originated.

The principal objects of the work of the Board being the collection and dissemination of knowledge tending to promote the public health, the work of the office may well be considered with reference to the accomplishment of these two objects.

While all the documents sent out by this Board are, to a certain extent, instructive, those primarily intended for the collection of facts have been placed in a group by themselves.

GENERAL PLAN OF COLLECTION OF INFORMATION.

For the collection of information relative to sanitary affairs, the principal lines of effort have been for the reception of annual reports, and reports of cases of diseases dangerous to the public health, from clerks and health officers of local boards of health; the securing of daily observations of meteorological conditions in as many different representative points as practicable throughout the State; the securing of reports of special sources of danger to life and health, —as contagious, infectious, and epidemic diseases, and facts concerning contamination of drinking-water; reports of special investigations concerning the causes of considerable outbreaks of disease, such, for instance, as the outbreaks of diphtheria at Union City and at Rochester; of yearly reports of prevailing diseases, by correspondents throughout the State, and their replies to circulars on special subjects, as, for instance, the circular on Scarlet Fever; the securing of additional correspondents in different parts of the State, to report to this office facts bearing on public health, as occurrences prompt, or whenever requested in reply to circulars.

The regular correspondents of the Board are mostly physicians, prominent in their respective localities, and by means of this Board a large amount of hitherto neglected and unused information on sanitary subjects in the possession of these men is now brought out and utilized for the benefit of the people.

Section 8 of the law establishing this Board is as follows:

SEC. 8. It shall be the duty of the health physician, and also of the Health clerk of the local board of health in each township, city, and village in this State, at least once in each year, to report to the State Board of Health their proceedings, and such other facts required, on blanks, and in accordance with instructions received from said State Board. They shall also make special reports whenever required to do so by the State Board of Health.

Acting under this provision, soon after the organization of the Board, a circular of instructions and a blank report were prepared and sent to clerks of local boards of health throughout the State. This circular and blank, printed on pages 9 and 10 of the First Annual Report, was issued to get in communi-

cation with local boards of health, to gain a knowledge of the name and address of the health officer, and to ascertain the number of cases of contagious or infectious diseases, then prevailing throughout the State. Subsequently, each local board of health was requested to keep a record of the name, age, and sex of each person sick with a disease which endangers the public health, the name of the disease, when taken sick, the length of time sick, and whether died, living, or recovered, etc.,—a copy of this record to be sent to this office whenever called for. Such reports have been demanded at the close of each year.

Health Officers and Clerks of local boards of health were also directed to promptly notify the State Board of Health of the outbreak of any communicable disease. Efforts have been made to trace such outbreaks to their sources and causes, when possible. This made it necessary to communicate freely with the physicians having charge of the cases. Considerable valuable material has thus been collected.

This Board has always felt the need of men who should, whenever asked, reply to questions of a general nature, as, for instance, the Circulars on Water-Supply, Prevailing Diseases, etc. At first the circulars, with stamped envelopes for return, were sent to prominent physicians throughout the State, but they did not reply to the circulars. It was then determined to ask such information of men who should specially undertake the task. Accordingly, a circular (see page xviii., Third Annual Report) was planned and printed, asking the person to whom it was addressed to promise to answer such questions as might be asked, and to report freely facts bearing on the subject of public health. By this means, over 100 correspondents have been secured who gratuitously render extremely valuable aid in the collection of information relative to public health and sanitary affairs.

From reporting on general topics, such as the facts relating to water-supply, the diseases prevailing during the year, etc., their field of labor has gradually increased until now it also includes answers to circulars on special subjects; and some correspondents also contribute weekly reports of the diseases present in their vicinity, etc.

METEOROLOGICAL OBSERVATIONS.

It has been considered desirable to secure a corps of Meteorological Observers in this State, to supply data for a study of the relations between meteorological conditions and the various diseases and causes of death that are known to be so largely influenced by heat, cold, moisture, and other atmospheric conditions. Quite a number of observers of meteorological phenomena have been secured for this purpose at different stations about the State. As the amount of money at the disposal of the Board, after the numerous other imperative uses for it had been attended to, has not been sufficient to equip these meteorological stations with complete outfits of standard instruments, some of these Observers are contributing observations of instruments procured at their own expense, while others contribute only so much as is possible with the instruments they have, including those supplied by this Board. An effort has been made to secure observations at each of the prominent State institutions. The names, locations, and time covered by reports of the Observers or persons under whose direction observations have been made in this State for this Board are as follows:

NAME.	LOCATION.	TIME COVERED BY REPORTS: FOR MONTHS OF
Henry F. Thomas, M. D.....	Allegan	Nov. 1875 to Dec. 1876.
J. H. Kellogg, M. D.....	Battle Creek.....	Jan. 1876 to Oct. 1877.
John Bell, M. D.....	Benton Harbor.....	Nov. 1875 to Oct. 1877.
Lyman P. Alden.....	State Pub. School, Coldwater.....	Oct. 1875 to Oct. 1877.
C. Henri Leonard, M. D.....	Detroit.....	Dec. 1875 to Oct. 1877.
F. W. Higgins, Supt.....	Woodmere Cemetery, Detroit.....	Jan. 1876 to Oct. 1877.
Theo. V. Van Heusen, U. S. Signal Service.....	Detroit.....	Dec. 1875 to Oct. 1877.
James S. Reeves, M. D.....	East Tawas.....	Feb. 1876 to April 1877, except Sept. 1876.
H. T. Calkins, M. D.....	Fyfe Lake.....	Jan. 1875 to Oct. 1877.
E. H. Van Deusen, M. D.....	Asylum for Insane, Kalamazoo.....	Dec. 1875 to Oct. 1877.
R. C. Kedzie, M. D.....	Agri. College, Lansing.....	Oct. 1875, Feb. 1876, and Jan. 1877 to Oct. 1877.
Edwin Stewart, M. D.....	Mendon	Jan. 1877 to Oct. 1877.
W. C. West, M. D.....	Monroe	Feb., March, April, May, Sept., Oct. 1876, and Jan. 1877 to July 1877.
James S. Reeves, M. D.....	Niles	June 1877 to Oct. 1877.
Lee S. Cobb.....	Nirvana, Lake Co.....	Nov. 1873 to Oct. 1877.
A. W. Nicholson, M. D.....	Otisville	May 1877 to Oct. 1877.
Dr. E. Hause.....	Tecumseh.....	Dec. 1875 to Oct. 1877.
C. M. Woodward.....	Tecumseh.....	March and April 1876.
John S. Caulkins, M. D.....	Thornville	Dec. 1876 to Oct. 1877.
Prof. L. McLouth	State Normal Sch'l, Ypsilanti.....	Dec. 1875 to Oct. 1877.

Three observations are taken each day, and at the close of each month a copy of the observations for that month is forwarded to this office. The kinds of information received may in this way be seen by referring to the copy of a blank "Monthly Register of Meteorological Observations" printed on pages xxxiv.-xxxviii. of the Third Annual Report of this Board. The data thus secured furnish one of the most important factors in nearly all questions relating to public health, and each year it grows more important.

OFFICIAL CORRESPONDENCE.

Another extensive source of information has been the correspondence of the office. The Secretary is in communication with leading sanitarians throughout the world, and the best Sanitary and Medical Journals are received, read, and placed in the library. The exchange with Boards of Health and other sanitary organizations is large, and the reports, etc., thus received constitute a valuable portion of the library, which now numbers over one thousand volumes. Each year a few books, bearing on sanitary subjects, are purchased and placed in the library. By these sources of information, it may be seen, the best knowledge of the world on sanitary subjects is brought side by side with the facts collected in this State.

GENERAL PLAN OF DISSEMINATION OF INFORMATION.

The methods of disseminating the information collected are three, viz.: by Annual Reports, by circulars of instruction, and by official correspondence. An Annual Report is published for each year, consisting of the Report of the

Secretary, which gives an outline of the work of the office of the Board; of papers, by the members of the Board and others, on subjects of importance relating to Public Health or Sanitary Science, and which are intended to embody the best information that can be obtained on the subjects treated; and, last, but by no means least, the contributions by the corps of Correspondents and Observers which this Board has organized and from which it receives a portion of the vast fund of information in the possession of physicians, and disseminates it among the people who are to be benefitted by this information. Circulars of instruction are planned, printed, and distributed, whenever material is ready on a subject which seems of sufficient importance to warrant the effort and outlay. Examples may be found in the "Shadows from the Walls of Death," relative to poisonous wall-papers, etc.; in the "Rules and Regulations recommended for adoption by Local Boards of Health throughout the State;" in the placard and pamphlet on "Treatment of the Drowned;" in the little pamphlet on the "Restriction and Prevention of Scarlet Fever;" and in the resolutions on the "Prevention and Restriction of Small-Pox." It often happens that circumstances arise which are as deserving of attention by this Board as were the examples mentioned above, except that from their local nature they may not be as extensive, and they cannot well be met in the same way. These wants are met by working up each individual case, and communicating by direct correspondence. Such instances are numerous and are increasing as the work of the Board becomes better understood. They greatly increase the work of the office, but it is believed that good results follow.

Thus in brief is sketched some of the principal lines of effort thus far entered upon by this Board. It now remains to be shown more explicitly what has been done in each of these directions during the year covered by this Report.

COLLECTION OF INFORMATION,—FISCAL YEAR 1877.

CIRCULAR TO CLERKS OF LOCAL BOARDS OF HEALTH, TRANSMITTING BLANK FOR THEIR REPORT FOR THE YEAR ENDING DECEMBER 31, 1876.

At the close of the year 1876, the following circular was planned, printed, and sent to 1,202 clerks of local boards of health, transmitting to them the blank form [D.] for their annual report. The information sought is evident on reading the documents. About 350 reports were received, and many of these were imperfect and required that a new blank with a letter of instructions for properly filling it be sent to the clerk making the return, before a correct report could be obtained. Those received were valuable and many important facts in regard to public health were learned from them, yet the number received is still too small to correctly represent the State in any compilation that might be made. They are on file in this office. Those officers of local boards of health who do not make their reports as the law requires, not only violate their official oaths, but do great injustice to those faithful officers who do report; because even the work of these faithful men is rendered less valuable by reason of the breaks in the ranks of townships, cities, and villages, where the local officers do not comply with the law.

The circular was as follows:

[14.]

OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH, }
 LANSING, MICHIGAN, December, 1876. }

To the Clerk of the Local Board of Health:

SIR:—Herewith I send you a blank form [D] for your use in making your Annual Report to this Board, required by law,* for the year ending December 31, 1876. PLEASE FILL OUT AND RETURN THIS REPORT AS SOON AS POSSIBLE AFTER THE CLOSE OF THE YEAR 1876. In making this report, you will probably do well to confer with the President, and also with the Health Officer of your Board. The blank is similar to one previously used, except that the questions relative to permanent conditions, such as soil, streams, timber, etc., are omitted for this year. In the meantime, replies to those questions will gladly be received from any clerk prepared to give them for localities for which accurate and full replies have not yet been given; and a blank will be set to any clerk requesting it for that purpose.

I send you a blank sheet for your Report of Cases of Diseases Dangerous to the Public Health. If you have any cases on your Record, which have not heretofore been reported to this office, PLEASE FILL OUT AND RETURN THIS REPORT AS SOON AS POSSIBLE after the close of the year 1876. If you have more cases to report than can be reported upon one side of a sheet (27), please write to this office for blanks, stating the additional number of sheets you need. If you have no case to report *please send a definite statement to that effect*; and whether you have cases recorded or not, *please state your belief as to the number of cases of each of such diseases that have occurred within your jurisdiction that have not been reported to you officially*. You will find blank spaces for this near the bottom of the first page of the blank form [D].

The blank which I send for your report of Cases of Diseases is essentially the same form as the one several times recommended by this Board as a proper form for your Record of such cases. For the purpose of beginning or continuing such a Record, you can obtain sheets, or books of sheets similar to this one, except that they are for a Record instead of a Report, at the place and for the price specified in note on page 18 of the First Report and on page xix. of the Second Report of the Secretary of this Board, which Reports are or should be in your possession.

The law requires that a notice be given to the Local Board of Health, or to the Health Officer, by every *householder*, whenever he shall know that any person within his family is taken sick with the small-pox, or any other disease dangerous to the public health. The law also requires *physicians* to report all such cases. See Sections (1734), (1735), 43 and 44, chapter 46 of Compiled Laws of Mich., 1871.

It is not expected that it will always be possible, from the notices which you receive, to fill every column of your record; but so much as it is possible to learn concerning each case should be recorded and reported, because the single fact of the number of cases of sickness from each such disease will be of value in connection with the records of deaths and other knowledge collected at this office.

It is again recommended that your Board of Health *have a sufficient number of blank notices printed* for the use of householders and physicians within your jurisdiction, and *distribute them* in order to call attention to the law, and secure the material for a complete record in your office. The two sections of law, referred to above, should be printed on the back of each blank. You can find the form for such blanks for notices on pages 13 and 14 of the First Report, and on pages xiii. and xiv. of the Second Report of this Board.

In case any disease should appear in your locality as an epidemic, please make a Special Report of the fact to this office as soon as possible, in order that the conditions of its progress and decline may be thoroughly studied.

By direction of the State Board of Health.

Very respectfully,

HENRY B. BAKER,

Secretary.

The blank form [D.] and the blank for report of cases of diseases, mentioned in the foregoing circular as accompanying it, were as follows (reduced in size):

* Act No. 81, Laws of 1873, SEC. 8. It shall be the duty of the health physician, and also of the clerk of the local board of health in each township, city, and village in this State, at least once in each year, to report to the State Board of Health their proceedings, and such other facts required, on blanks and in accordance with instructions received from said State Board. They shall also make special reports whenever required to do so by the State Board of Health.

[Before filling any blanks, please read carefully through the entire form, including foot-notes and instructions.]

[D.]

To the Secretary of the State Board of Health: SIR:—

Herewith is¹..... sent, on a separate sheet, a Report of cases of Diseases Dangerous to the Public Health. With..... that sheet, the following constitutes the ANNUAL REPORT TO THE STATE BOARD OF HEALTH, by the Clerk of the Board of Health for the*..... of....., County of....., State of Michigan, for the year ending December 31, 1876.

Compared with previous years, the proportion of deaths to inhabitants in this*..... during the year ending December 31, 1876, was².....

Compared with previous years, the proportion of sickness among the people of this*..... during the year ending December 31, 1876, was³.....

The greatest number of the deaths were from the diseases or causes (named in the order of greatest number), as follows:.....

The greatest number of cases of sickness was from diseases as follows:

To the best of my knowledge and belief, during the year ending December 31, 1876, cases have occurred of epidemic, infectious, or contagious diseases, as follows: Of small-pox,.....cases; of cholera,.....cases; of scarlet fever,.....cases; of typhoid fever,.....cases; of measles,.....cases; of whooping-cough,.....cases; of cerebro-spinal meningitis,.....cases; of diphtheria,.....cases; of.....cases.

The date of the first case of each disease was as follows: Of small-pox,.....; of cholera,.....; of scarlet fever,.....; of typhoid fever,.....; of measles,.....; of whooping-cough,.....; of cerebro-spinal meningitis,.....; of diphtheria,.....; of......

The date of the last case was as follows: Of small-pox,.....; of cholera,.....; of scarlet fever,.....; of typhoid fever,.....; of measles,.....; of whooping-cough,.....; of cerebro-spinal meningitis,.....; of diphtheria,.....; of......

Cases of epidemic, infectious, or contagious diseases now prevail as follows: Of small-pox,.....cases; of cholera,.....cases; of scarlet fever,.....cases; of typhoid fever,.....cases; of measles,.....cases; of whooping-cough,.....cases; of cerebro-spinal meningitis,.....cases; of diphtheria,.....cases; of.....cases.

The number of deaths during the year ending December 31, 1876, from epidemic, infectious, or contagious diseases, is as follows: From small-pox,.....; from cholera,.....; from scarlet fever,.....; from typhoid fever,.....; from measles,.....; from whooping-cough,.....; from cerebro-spinal meningitis,.....; from diphtheria,.....; from......

So far as known, the sources from which the diseases were derived were as follows:³ Of small-pox,.....; of cholera,.....; of scarlet fever,.....; of typhoid fever,.....; of measles,.....; of whooping-cough,.....; of cerebro-spinal meningitis,.....; of diphtheria,......

In my opinion, cases of disease have occurred within the jurisdiction of this board, during the year ending December 31, 1876, that have not been reported to me officially, as follows: Of small-pox,.....cases; of cholera,.....cases; of scarlet fever,.....cases; of typhoid fever,.....cases; of measles,.....cases; of whooping-cough,.....cases; of cerebro-spinal meningitis,.....cases; of diphtheria,.....cases. These cases are included in the foregoing statement.

The number of cases of diseases on my record which have not heretofore been reported to the State Board of Health, and which I report at this time in detail, on the blank for that purpose,⁴ are as follows: Of small-pox,.....cases; of cholera,.....cases; of scarlet fever,.....cases; of typhoid fever,.....cases; of measles,.....cases; of whooping-cough,.....cases; of cerebro-spinal meningitis,.....cases; of diphtheria,.....cases; of.....cases.

I attribute the⁵.....in this*.....during the year ending December 31, 1876, to the following causes or circumstances:.....

In my opinion the principal sources of danger to life or health in this*.....at the present time are as follows:.....

During the year ending December 31, 1876, the climatic conditions observed by me

were as follows:.....

During the year ending December 31, 1876, this Board of Health has met as a board.....time., and the following is a condensed abstract of its proceedings:.....

The name of the physician appointed as Health Officer of this Board is.....
His P. O. address is.....

My own P. O. address is.....

I hereby certify that, to the best of my knowledge and belief, the statements in the foregoing report are correct.

Dated....., 1877.

Signed.....
*Clerk of the Board of Health⁶ for the**.....of.....

FOOTNOTES AND OTHER INSTRUCTIONS.

* Insert the word township, city, or village.

¹ If not sent, insert the word "not."

² Insert the word "greater," "less," or "the same," as the fact may be.

³ After each disease insert the words "the disease was contracted in the city of.....," "or at the school in.....," "in a room occupied by persons sick with the same disease.....time since," "by means of clothing worn by patient with same disease," etc., etc., as the facts may be. In the case of typhoid fever, if the privy was near the well, or within the dwelling, state the facts.

⁴ If there is absolutely no case to report, the blank form for cases need not be sent in as a part of your report.

⁵ Insert the words "excessive mortality," "excessive sickness," "general healthfulness," or otherwise express the facts.

⁶ Section (1692) 1, of Chapter XLVL, Compiled Laws of 1871, provides that "The supervisor and justices of the peace of every township, respecting which no other provision is or shall be made by law, shall be a board of health for their respective townships, and *the township clerk shall be the clerk of such board*, and shall keep a record of their proceedings in a book to be provided for that purpose at the expense of the township."

In filling blanks followed by such words as "deaths," "cases," etc., numbers should be stated if possible, either in words or figures, and "0" should be written where that expresses the truth, for the reason that a *blank space indicates that the item has been overlooked*.

Please answer the questions as they are printed, and in the blanks left for the purpose. *Do not change or mark out any of the printed matter*. If you wish to communicate any item which will not go in the blank as printed, please write on a separate sheet of paper.

PLEASE FILL ALL BLANKS IN SOME WAY, TO SHOW THAT NONE HAVE BEEN OVERLOOKED.

TO THE SECRETARY OF THE STATE BOARD OF HEALTH.

SIR:—The following is a Report consisting of a copy of the Record of Cases of Diseases Dangerous to the Public Health which have Occurred in the ----- of -----, County of -----, State of Michigan.

[illegible]

The reported source of Contagion or Infection, in each case, was as follows: For the case recorded as No. it was.....

I hereby certify that the above Report of cases of Diseases Dangerous to the Public Health is a correct transcript from the Records of this office.

Dated at..... 187..

[OFFICIAL SIGNATURE].....

CIRCULAR TO PRESIDENTS OF LOCAL BOARDS OF HEALTH, TRANSMITTING BLANKS
FOR RETURN OF NAME AND POST-OFFICE ADDRESS OF HEALTH OFFICER.

The Legislature during its session in 1876-7 passed an act *requiring* each township board of health to appoint a health officer within thirty days after the annual township meeting, and constantly to have a health officer. In order that as many townships as possible might appoint health officers for that year, a circular was planned embodying a copy of the law, and transmitting a blank for the return of the name and post-office address of the health officer appointed. The circular and blank were sent to each supervisor in the State. They are as follows:

[18.]

OFFICE OF THE STATE BOARD OF HEALTH, }
Lansing, Mich., April, 1877. }

To the Supervisor, as President of the Township Board of Health:

SIR:—Herewith I send you a certified copy of an act just passed, and ordered to take immediate effect, by the legislature of this State, and which necessitates action by your local board of health “within thirty days after the annual township meeting.” * Herewith please find a blank form and a printed envelope for the use of your board in sending to this office the statement of name and post-office address of your health officer, as required by this law.

If any change shall occur in the health officer * or in his post-office address, it will facilitate our work if your board will cause a notice of such change to be sent to this office.

In addition to his services as sanitary adviser of your local board of health, it is desirable that your health officer correspond freely with this office, concerning subjects connected with the public health in your locality. Any important sanitary experience of your board may, if thus reported, be made useful to other boards of health throughout the State.

By direction of the State Board of Health.

Very respectfully,

HENRY B. BAKER,
Secretary.

* Section 2 of this act requires that “Every township board of health shall * * * constantly have a health officer,” and provides for calling special meetings of the board, for any purpose. If no health officer is appointed “within thirty days after the annual township meeting,” it will become necessary to appoint one after that time to fill the vacancy. Vacancies also occur whenever the incumbent of an office ceases to be an inhabitant of the district, county, township, city, or village for which he was elected or appointed an officer,—see section 617 Compiled Laws of Mich., 1871.

Before entering upon his duties, the health officer should take and subscribe the official oath required by Sec. 1, Art. xviii. of the Constitution of this State, and file the same in the office of the township clerk.

AN ACT to amend sections 1692 and 1693, chapter 46, of the compiled laws of 1871, relative to boards of health and health officers in townships.

The People of the State of Michigan enact, That sections 1692 and 1693, chapter 46, of the compiled laws of 1871, be and the same are hereby so amended as to read as follows:

(1692.) SECTION 1. In every township the township board shall be the board of health. The supervisor shall be the president, and the township clerk shall be the clerk of said board. The clerk shall keep a record of the proceedings of the board in a book to be provided for that purpose at the expense of the township.

(1693.) SEC. 2. Every township board of health shall appoint and constantly have a health officer of the township who shall where practicable, be a physician and sanitary adviser, and an executive officer of the board: *Provided,* That in townships where it is not practicable to secure the services of a well educated and suitable physician, the board may appoint the supervisor or some other person as such health officer. The board of health shall establish his salary or other compensation, and shall regulate and audit all fees and charges of persons employed by them in the execution of the health laws and of their own regulations. Within thirty days after

the annual township meeting in each year, the board of health shall meet for the transaction of business and shall appoint or re-appoint a health officer, and shall immediately cause to be transmitted to the Secretary of the State Board of Health, at Lansing, the full name and post-office address of such health officer, and a statement whether he is a physician, the supervisor, or some other person not a physician. A special meeting of the board may be called by the order of the president or of any two members of said board.

SEC. 1. This act shall take immediate effect.

Approved April 20, 1877.

CHARLES M. CROSWELL.

ALONZO SESSIONS,

President of the Senate.

JOHN T. RICH,

Speaker of the House of Representatives.

STATE OF MICHIGAN, {
Office of Secretary of State, { ss.

I, E. G. D. HOLDEN, Secretary of State of the State of Michigan, DO HEREBY CERTIFY that I have compared the annexed copy of an act entitled "An act to amend sections 1692 and 1693, chapter 46, of the compiled laws of 1871, relative to boards of health and health officers in townships," with the original as enrolled and now on file in this office, and that it is a true and correct transcript therefrom, and of the whole of such original.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the Great Seal of the State of Michigan, at Lansing, this twenty-third day of April, in the year of our Lord one thousand eight hundred and seventy-seven.

E. G. D. HOLDEN, *Secretary of State.*

By WM. CROSBY, *Deputy.*

[Please fill every blank, by words or figures, or as directed in the foot-notes. Do not mark out any printed word.]

[E.]

To the Secretary of the State Board of Health:

SIR:—On the.....day of....., 187..., the Board of Health of the township of....., County of....., State of Michigan, met for the transaction of business and*.....appointed a Health Officer.

The name of the Health Officer of this township is.....

His post-office address is....., County of....., Michigan.

He †.....a physician.

He †.....the Supervisor of this township.

†....., Supervisor of the township of.....

P. O. Address:.....

†....., Township Clerk and Clerk of the Board of Health.

P. O. Address:.....

This return is made out by §.....

Dated at....., this.....day of....., 187....

* If re-appointed, write "re," if not, draw a line here.

† Insert the word "is," or "is not," as the case may be.

‡ It is not essential that more than one of the officers sign this return, but it is desirable to have the name and P. O. address of each given. If either officer writes in the name of the other, this fact should appear on this return, so that the officer making the return may be known.

§ Insert the words "the Clerk," "the Supervisor," "the Clerk and Supervisor," or otherwise state the facts.

In some of the townships, no health officer was appointed within thirty days after the annual township meeting, and in some of these townships the board of health did not seem to understand that the law requires that there shall constantly be a health officer. In order to secure the appointment of a health officer in all the townships, the circular was marked so as to call attention to the fact that a special meeting could be called, and that such a case should be considered as a vacancy in office, and the vacancy filled as soon as practicable, and the marked circular was sent to the supervisors of such townships as had not returned the name and post-office address of their health officer.

About 850 townships appointed health officers, and made the proper returns to this office. This was a long way in advance of anything that had hitherto been done to render local boards of health active and efficient, and it is believed to be the beginning of good work in this direction among township boards of health.

CIRCULAR TO THE MAYOR AND ALDERMEN OF THE CITY, OR THE PRESIDENT AND COUNCIL OF THE VILLAGE, TRANSMITTING A BLANK FOR THE RETURN OF THE NAME AND POST-OFFICE ADDRESS OF THE HEALTH OFFICER.

It was believed that the law requiring townships to appoint health officers was equally applicable to cities and villages whose charters did not conflict with this general enactment.* Accordingly a circular, setting forth the law, and the opinion of the Attorney General on the subject, was planned, printed, and sent to each city and village in the State.

The circular and accompanying blank were as follows:

[20.]

OFFICE OF THE STATE BOARD OF HEALTH, }
LANSING, MICH., August, 1877. }

To the Mayor and Aldermen of the City, or the President and Council of the Village:

GENTLEMEN:—Your attention is respectfully asked to the general law relative to Boards of Health in this State, as amended at the last session of the legislature. Act No. 56, Laws of Michigan, 1877, amends section (1693), being section 2 of chapter 46 Compiled Laws of 1871, and section 2 of chapter 35 of the Revised Statutes of 1846. The amendment is such that whereas heretofore a health officer might be appointed by the board of health, it is now required that such officer shall be appointed; and if practicable he must be a physician. The amended law also requires that notice of such appointment shall be sent to the Secretary of the State Board of Health. The section as amended is as follows:

(1693.) SEC. 2. Every township board of health shall appoint and constantly have a health officer of the township who shall where practicable, be a physician and sanitary adviser, and an executive officer of the board: *Provided*, That in townships where it is not practicable to secure the services of a well educated and suitable physician, the board may appoint the supervisor or some other person as such health officer. The board of health shall establish his salary or other compensation, and shall regulate and audit all fees and charges of persons employed by them in the execution of the health laws and of their own regulations. Within thirty days after the annual township meeting in each year, the board of health shall meet for the transaction of business and shall appoint or re-appoint a health officer, and shall immediately cause to be transmitted to the Secretary of the State Board of Health, at Lansing, the full name and post-office address of such health officer, and a statement whether he is a physician, the supervisor, or some other person not a physician. A special meeting of the board may be called by the order of the president or of any two members of said board.

This section, as amended, refers, as heretofore, only to township boards of health; but section 49 of the same chapter (chapter 35 of the Revised Statutes of 1846, and chapter 46 of the Compiled Laws, 1871) makes it apply to cities and villages. That section is as follows:

(1740.) SEC. 49. The mayor and aldermen of each incorporated city, and the president and council, or trustees, of each incorporated village in this State, shall have and exercise all the powers and perform all the duties of a board of health, as provided in this chapter, within the limits of the cities or villages, respectively, of which they are such officers.

The force and application of this section having been questioned in one instance, in order to dispel any doubts that have arisen or that might otherwise arise because of the recent amendments of the chapter, the opinion of the Attorney General of the State, has been obtained on this subject. His opinion is as follows:

"In reply, I beg leave to say that the officers mentioned in section 1740, Compiled Laws of 1871, are required to carry out, in all respects, the provisions of chapter 46 Compiled Laws, unless the charters of the respective cities and villages have made other provision for guarding the public health. It is impossible to say in the abstract how far charter provisions may stand side by side with general enactments, such as chapter 46 Compiled Laws, or how far one may modify the other. Each case must stand upon its own basis. Of course, it follows from what I have stated that a

*A letter was sent to each city in the State asking a copy of its charter; and, although many were received, none has been found which conflicted with this general provision.

'health officer' must be appointed in cities and villages whose charter provisions do not conflict with the general law.

Very respectfully,

OTTO KIRCHNER,
Attorney General."

It is believed that there is nothing in your charter that conflicts with this provision of the general law. In complying therewith please use the printed envelope and blank form herewith transmitted, to return to this office the name of the physician whom your honorable body appoint, or have appointed, as your health officer. Have the kindness to add a statement of the time when his term of office will expire. In this blank, provision is made for reporting a health officer not a physician, although it is believed to be "practicable to secure the services of a well-educated and suitable physician" in every city and incorporated village in this State. Please have the fact stated in the return, as provided for in the blank form.

If the person who is in fact the Health Physician for your corporation is known by some other title, will you have the kindness to give this information also in the return?

A return is expected from your corporation, even though some of the duties of a board of health are delegated to other persons than the Mayor and Aldermen, or President and Council, as the case may be. It is believed that the duty of making a return in accordance with section (1693) as lately amended, is not delegated, but is one of "the duties of a board of health as provided in this chapter" that must be performed by your honorable body in accordance with the general law hereinbefore referred to, namely, Sec. (1740) Sec. 49, Chapter 46, Compiled Laws of 1871. If your charter contains such provisions as make it clear that this duty should be performed by some other body than your own, will you have the kindness to transmit this communication to that body, and to inform this Board of the fact?

The law requires that the local board of health shall "constantly have a health officer." If, by reason of the death, resignation, or removal of your health officer, another person shall be chosen to that office, it will facilitate our work if you will cause a notice of such change to be sent to this office.

The recent amendment relative to the Health Officer very properly requires that "The board of health shall establish his salary or other compensation." In one instance a person who acknowledged that he had been appointed Health Officer of a city has declined to report to this Board, giving as a reason that his appointment was simply nominal, that he received no compensation, and had taken no oath of office or in any way signified his acceptance of the office. This leads to the suggestion that the person whom you appoint, or have appointed, as your Health Officer be directed to take and subscribe the official oath required by Sec. 1, Art. xviii., of the Constitution of this State, and file the same with the clerk of your corporation, and that in case his acceptance of the office be not thus signified, it should be considered that the office is not accepted, and another appointment be made.

In addition to his services as sanitary adviser of your local board of health, the law also requires that your health officer shall report to this Board annually, and "when-ever required to do so by the State Board of Health," (Sec. 8, Act 81, 1873.) It is also desirable that he correspond freely with this office, concerning subjects connected with the public health in your locality. Any important sanitary experience of your board may, if thus reported, be made useful to other boards of health throughout the State.

By direction of the State Board of Health.

Very respectfully,

HENRY B. BAKER,
Secretary.

[Please fill every blank, by words or figures, or as directed in the foot-notes. Do not mark out any printed word.]

[F.]

To the Secretary of the State Board of Health:

SIR:—The name of the Health Officer of this*..... is

His full postoffice address is....., County of....., Michigan.

He..... a physician.

His term of office expires

The person who is in fact the Health Physician of this*..... is entitled by our charter:‡.....

By direction of the§.....

Signed,....., Clerk
of the*..... of.....

Dated at....., this..... day of....., 187....

* Insert the word "city" or "village," as the case may be.

† Insert the word "is" or "is not," as the case may be.

‡ Please insert the words: "Health Officer," "President of the Board of Health," or state that the Health Officer is appointed by your body and not mentioned in the charter; or otherwise convey knowledge of the facts as they may be.

§ Insert the words "Mayor and Aldermen of the City of....." or "President and Council of the Village of....." or "Board of Health of the City (or village) of.....," if this return is not made by the Common Council.

A majority of the cities responded, and returned the names of the health officer appointed. In several instances health officers were appointed where the office had been vacant. Not all cities complied with the law.

The villages were not as prompt as the cities in responding to the demand. Although quite a number complied with the law, many failed to do so.

Instances frequently come to notice which show the beneficial influence that this Board, as an advisory body, has already had over local legislation by city and village councils and by other local boards of health. In localities where no boards of health were recognized, they have been brought into working order; and where they existed only in name they have become efficient bodies; the powers and duties of such boards have been better exercised, their health officers are becoming such in reality, common councils have passed ordinances tending greatly to improve the sanitary conditions of their cities and villages, and generally throughout the State more intelligent attention is being given to the interests of the people in life and health than was formerly devoted to such subjects.

METEOROLOGY.

Nearly two hundred monthly Meteorological Registers have been received during the year, on the blanks furnished by this office, and mentioned on page xiii of this volume. These meteorological statements are studied as they come in, and compared with the weekly reports of diseases; their main value, however, is as permanent records for use in long series of years. They are now being computed, compiled, and tabulated for publication.

As before stated, not all the observers have a complete set of instruments; hence some of the Registers are incomplete. This deficiency in instruments is being supplied by the Board as rapidly as its limited means will permit.

The following instruments have been placed during the year, viz.:

Seven psychrometers.

Two wet-bulb thermometers, for psychrometers.

One Robinson's Anemometer with self-registering apparatus.

One Green's Standard barometer.

One maximum thermometer.

One minimum thermometer.

Two rain gauges with measures.

These were all standard instruments and are now being used for good work in the cause of public health.

REGULAR CORRESPONDENTS.

During the year, 42 new correspondents have been added to the list, making 113 in all. They are located as nearly as possible at representative points throughout the State, and the aim is to secure the best physicians, and those whose practice is a good representative of the diseases of their vicinity, or whose knowledge of the facts is likely to be general. This corps of correspondents probably contribute more and better information on the subject of health and disease than any other class of men in the State, and this is the more praiseworthy because it is done gratuitously. Much of the valuable work of this Board depends upon their action. They are looked to for facts concerning the physical conditions in their several localities, the diseases of different seasons of the year, and in different years, the study of special diseases and their causes, unsanitary conditions generally, and to supplement the information supplied by local health officers concerning the rise and progress of, and other facts relating to, epidemics and outbreaks of communicable diseases. A majority of the meteorological observers are also correspondents. Much of the work done by correspondents for this Board during the year has been in reply to circulars, and in the weekly reports of diseases.

CIRCULAR TO CORRESPONDENTS, RELATIVE TO PREVAILING DISEASES, 1876.

This circular, with some amendments and additions, is similar to the one sent out in 1875; and is replied to much more fully, both as to the numbers and completeness of replies. A general summary of these replies may be found on pages 169–184 of this Report, and the replies themselves are printed on pages 187–233. As the circular is printed on pages 185–186, it is unnecessary to print it in this connection.

CIRCULAR TO CORRESPONDENTS, RELATIVE TO SCARLET FEVER.

This circular was prepared with a view of gaining further information on the subject of this alarmingly fatal disease. An account of the action which led to its preparation can be seen on pages 393–394 of this volume. It was issued at about the same time that the document on Restriction and Prevention of Scarlet Fever was published (for a copy of which see pages xxix–xxxii inclusive, of this volume),—a document which was made in accordance with the present state of Sanitary Science, without waiting for the valuable contributions by the regular correspondents of the Board, which are now given in full in this volume. The circular was planned with care, after considerable thought and study on the subject, and was intended not only to gain present information, but to start investigation in some new channels, and prepare the way for a better understanding of the disease in the future. A summary of the replies to this circular may be found on pages 398–408 of this volume, and the replies themselves are printed on pages 408–447. As the circular is printed on pages 394–397, it is unnecessary to repeat it in this connection.

Two circulars by Henry F. Lyster, M. D., member of this Board, and its Committee on Sewerage and Drainage, were printed and sent to correspondents by this office. One was in reference to the surroundings and location of dwellings, and may be found in his article on Healthful Dwellings, page 57 of this Report. The second was in relation to Baths and Bathing, and is printed in the article on that subject in this Report, page 120.

WEEKLY REPORTS OF DISEASES.

This work, begun before the last Report, has been continued during the present year. It has steadily increased in value, both as to the accuracy of the individual reports, the regularity of their receipt, and in the number and representative position of Observers who report. During the year, 3,900 blank postals for reports, and 300 blank record-books were printed and distributed to the Observers of diseases, by quarterly distributions. The compilations of these reports in this volume (pages 248-343) cover the reports during the entire fiscal year. As the meteorological and other data to be compared with these disease reports must almost of necessity be compiled for the calendar year, an attempt will be made, in future Reports, to render this comparison easier by computing the whole for the calendar year. Although the amount of work necessary to successfully compile and publish a registration of diseases was known to be great, it has exceeded all expectations. The ability of the office has been severely taxed in order to make the the compilations, and the publication of the Report has been delayed in consequence, in spite of all efforts to the contrary. That the attempt has once failed in England, on account of the labor required, does not now seem strange. Some of the over-work has been due to imperfect plans, and the changes always necessary in beginning a work of this kind; and, although there is still room for improvement, it is believed that the plans and blanks for compilation have been so improved that, in future years, the work will be better and more easily done. The benefits to be expected from such a system are numerous. When it is possible to compare the sickness-rate with the death-rate, even approximately, it is hoped that much light will be thrown upon the importance of certain diseases, and their consideration will be correspondingly modified. By comparing the sickness-rate with meteorological data much will probably be learned concerning the causes that produce or modify disease, and thereby we will be better able to favorably influence, and to prevent much sickness which now seems unavoidable.

PRINTED LETTER TO OBSERVERS OF DISEASES ASKING FOR MISSING REPORTS.

Those Correspondents and Health Officers who make weekly reports of diseases, are, for convenience at this office, denominated "Observers of Diseases."

It has frequently happened that complete reports had not been received from the Observer at the time of compilation, and to obviate the necessity of writing to each one, the following letter-blank was planned and printed. It has been used when occasion demanded. The letter-blank was as follows:

[Printed letter to Observers of Diseases, asking for missing reports.]

OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH, {
LANSING, MICHIGAN,187... }

DEAR SIR:—If you have the record, and can conveniently do so, will you have the kindness to send me, on the enclosed postal blank..., statements of the Order of Prevalence and of the Severity of the Diseases in your locality during each of the weeks ending on Saturday, as follows:.....? Your report... for the above mentioned week... ha... never reached this office; and as a compilation of the weekly reports of diseases is being made, I desire that each observer's reports shall be as full and as nearly complete as possible.

If you cannot supply the desired information, please send me a postal statement to that effect. If you can do so, I shall be thankful if you will comply with the above request soon.

Very respectfully,

HENRY B. BAKER,
Secretary.

CIRCULAR TO DELINQUENT HEALTH OFFICERS OF CITIES, DEMANDING WEEKLY
REPORTS OF DISEASES.

At the beginning of January, 1877, many of the Health Officers of cities were not complying with the demand for weekly reports of diseases. In order to bring their attention to their duty under the law, and to secure future reports, the following circular was planned, printed, and sent to those health officers of cities who were not reporting:

[16.] OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH, }
LANSING, MICHIGAN, JANUARY, 1877. }

-----, M. D., Health Physician,
Of the city of -----,

Michigan:

DOCTOR:

In August last I sent to you a copy of Circular [13], a blank Record, and a number of postal-card Blanks for the return of prevailing diseases. The Circular contained an official request that you make to this Board weekly reports of diseases prevalent in your city, on the blanks furnished you from this office. Such reports from you have not been regularly received.

The law provides for special reports from medical officers of health to this Board whenever this Board requires them.* It is particularly desirable that for the year 1877 complete reports may be received from all the cities in the State, and that the reports be continuous for the full year. It is hoped and expected that, as a Medical Officer of Health, you will see your duty in this direction, and contribute promptly from this time forward.

This demand is made of you because this Board has been informed that you are the Health Physician of your city. If you are not such officer, will you have the kindness to return the blanks sent to you, with a statement to that effect? If you are such officer, please respond immediately.

A stamped envelope is enclosed for your use in communicating with this office.

By direction of the State Board of Health.

Very respectfully,

HENRY B. BAKER,
Secretary.

* Laws of 1873, Act No. 81, "Sec. 8. It shall be the duty of the health physician, and also of the clerk of the local board of health in each township, city, and village in this State, at least once in each year, to report to the State Board of Health their proceedings, and such other facts required, on blanks and in accordance with instructions received from said State Board. They shall also make special reports whenever required to do so by the State Board of Health."

BOOKS AND PERIODICALS.

A list of the books and periodicals received, by purchase and otherwise, and placed in the library, may be found in the Secretary's "Report of Property," commencing on page xli of this volume.

INFORMATION BY CORRESPONDENCE, ETC.

In addition to these general means of collecting information, very much has been gathered by piecemeal. In this way the letters on diphtheria, and also those on erysipelas and puerperal fever, published in this Report, were collected. But space will not permit the enumeration of the work that has been done in this direction. It is, perhaps, enough to say that much has been received from men in all parts of the State, who report facts of interest relative to public health; that an extensive correspondence has been carried on with sanitarians in other states and countries; that members of the Board have observed and reported the proceedings of meetings of societies and associations whose aim is the promotion of public health; that special outbreaks of disease have been in-

vestigated and studied; and that whenever a favorable opportunity for gaining sanitary knowledge has occurred, the Board has endeavored to improve it.

DISSEMINATION OF INFORMATION,—FISCAL YEAR 1877.

Reports, documents, etc., containing information concerning sanitary subjects have been distributed as follows:

FOURTH ANNUAL REPORT.

The Fourth Annual Report is a work of over 250 pages, and contains twelve special papers bearing closely upon different subjects relating to the public health and safety; besides the report of the Secretary, which contains an abstract of the proceedings of the Board, its members and committees, the Secretary's report of property, etc.; the circulars and blanks issued during the year; special reports, communications, etc.,—the whole of which is carefully indexed. Six thousand copies were published and nearly all have been distributed. Besides those distributed under the law by the Secretary of State, this Board has sent out over three thousand two hundred copies to members of local boards of health, other civil officers, and "persons interested in and laboring for the promotion of the public health." Nearly half of these were sent out singly; the remainder in boxes to the county clerks, to be delivered to such persons as were each directed, by a communication from this office, to call for them. The following circular was sent to each county clerk at the time the books were sent:

OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH, }
Lansing, Mich., -----, 1877. }

To the ----- County Clerk:

DEAR SIR:—I have this day forwarded to you by -----, ----- copies of the Fourth Annual Report of the Secretary of the State Board of Health. Will you have the kindness to distribute them as follows: One copy to each Health Officer of a Township, one copy each to the Health Officer, President, and Clerk of each incorporated Village, and one copy each to the Mayor and Health Officer of each City. These officers will be notified that the books have been sent for them in your care.

I send a sufficient number of copies to supply all the above-mentioned officers in your county. If because of vacancies, or for other reasons, the Reports are not all delivered to the proper persons, please preserve any that may remain for such disposition by this office as may be found will best meet the intentions of the law.

Have the kindness to acknowledge the receipt of the books, stating the number received, on the enclosed postal card, and oblige,

Very respectfully,

HENRY B. BAKER,
Secretary.

Circulars were prepared and a copy sent to each Health Officer of a local board of health, to each President of the village as president of the local board of health, to each Clerk of the village as Clerk of the local board of health, and to each Mayor of a city. The circular as sent to the President of the village as President of the local board of health was as follows:

OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH, }
LANSING, MICHIGAN, September, 1877. }

To the President of the Village, as President of the Local Board of Health:

SIR:—Please call on your County Clerk for a copy of the "Fourth Annual Report of the Secretary of the State Board of Health," for the year 1876, which has been forwarded in his care for you as President of a local Board of Health.

Please preserve the Report for the use of yourself and your successors in office.

The number of copies printed is not sufficient to furnish one to every member of the local Boards of Health: but, as has been done with the previous Reports, one copy has been sent from the State Department for each City and Township Library, and from this office, for the President and Clerk of each village, as President and Clerk of the local Board of Health.

It is hoped that, if it has not already done so, your board will immediately have printed and distributed among physicians and householders within its jurisdiction, the blank for Notices of "Diseases dangerous to the public health," recommended by this Board. A copy of the blank notice was sent with the circular [19] to the Health Officers of local Boards, in June last.

The form may also be found on page xiii. of the Second Annual Report of this Board. A sample copy, amended to show its application to cities and villages, is also sent to you herewith.

If the Clerk and Health Officer of your Board have not already begun Records of diseases which endanger the public health, it is respectfully suggested that your Board direct each of them to procure a blank Record-book, and to begin recording as soon as cases of diseases are reported to them or brought to their notice.

Sections 1734 and 1735, Compiled Laws of 1871, provide that notices may be given "to the Board of Health, or to the Health Officer." It is not probable that many will give notice to more than one officer, so that if the clerk records all cases reported to the "Board of Health," and the Health Officer records all cases reported to him, an annual report from each of these officers to this Board should include all cases reported during the year.

The form of Record recommended by this Board is printed on page xxii. of the Second Annual Report of this Board, and a sample was sent to the Health Officers in this State in June last. You can procure similar printed sheets from W. S. George & Co., of Lansing, for eighty cents per quire, or three dollars per hundred. If desired, the same dealers will bind them at usual rates.

Very respectfully,

HENRY B. BAKER,
Secretary.

The circular to the Clerk of the Village was, in substance, essentially the same as that to the President, with such differences in the wording as should make it apply to the officer addressed. The circular to the Health Officer was also similar to the two mentioned, and in addition called his attention to circular 19, which gives an outline of his duties as sanitary adviser. The circular to the Mayor of the City simply asked him to call on the County Clerk for a copy of the "Fourth Annual Report of the State Board of Health."

RESTRICTION AND PREVENTION OF SCARLET FEVER.

The mortality from scarlet fever in this State has been great. In fact, for some time, only one or two diseases have been reported as causing a greater number of deaths. Believing that many of these deaths might be prevented, the Board made arrangements for issuing a document on the restriction and prevention of the disease, as may be seen on pages 393-394 of this volume. The document as issued was intended to embody the best thought and experience available on the subject, and if its directions are faithfully carried out, it is believed that in every year hundreds of valuable lives will be saved for future usefulness. It was printed in the form of an eight-page pamphlet, and 20,000 copies were printed. They were distributed freely throughout the State, it being intended that every member of a local board of health, every newspaper, every physician, every justice of the peace, every township and city superintendent of schools in the State should receive at least one copy. They were also sent to many sanitarians; and extra copies were sent to places where scarlet fever prevailed. The document was as follows:

RESTRICTION AND PREVENTION OF SCARLET FEVER.

[DOCUMENT ISSUED BY THE MICHIGAN STATE BOARD OF HEALTH.]

Scarlet Fever is now believed to be one of the most contagious diseases.* One attack usually prevents subsequent attacks. The greatest number of deaths from this disease are of children under ten years of age. Adult persons do sometimes have the disease. Scarlet Fever is believed to arise from a special contagium or poison which may be conveyed, to persons previously unaffected, by personal contact, by infected clothing or paper rags, or by any of the discharges from the body of a person affected with the disease.

The discharges from the throat, nose, and mouth are considered extremely dangerous, but those from the skin, eyes, ears, kidneys, and bowels are also dangerous, and remain so for a considerable time.

Filth, all forms of uncleanness, and neglect of ventilation increase the danger of spreading the disease.

Communication.—It is believed that the disease may be communicated by a person recovering therefrom, so long as the usual subsequent scaling or peeling of the skin continues, which sometimes is not completed before the lapse of seventy or eighty days, although usually completed sooner.

The interval of time which may elapse after exposure to the contagium of scarlet fever, and during which a susceptible person so exposed may expect to be taken sick with the disease, varies from one to fourteen days.

Separation of the sick from the well. Whenever a child has sore throat and fever, and especially when this is accompanied by a rash on the body, the child should be immediately isolated as completely as possible from other members of the household, and from other persons, until a physician has seen it and determined whether it has scarlet fever. **All persons known to be sick with this disease should be promptly and thoroughly isolated from the public.**

That this is of more importance than in the case of small-pox is indicated by the fact of the much greater number of cases of sickness and of deaths from scarlet fever,—a disease in which there is no such preventive known as vaccination.

The room into which one sick with the disease is placed should previously be cleared of all needless clothing, carpets, drapery, and other materials likely to harbor the poison of the disease, except such articles as are essential to the well-being of the patient. The sick-room may have no carpet, or only pieces which can afterwards be destroyed. Provision should be made for the introduction of a liberal supply of fresh air and the continual change of the air of the room without sensible currents or drafts.

Pocket-handkerchiefs, that need to be saved, should not be used by the patient; small pieces of rag should be substituted therefor, and after being once used should be immediately burned.

Soiled bed and body linen should be placed in vessels of water containing chlorinated soda, chlorinated lime, or other disinfectant, before removal from the sick-room.

For this purpose chlorinated soda is the neatest and most convenient, because it can be used with soap, but it is apt to lose its disinfecting properties by age. Chlorinated lime, if used too freely, may destroy articles of clothing with which it comes in contact, but if properly used it is the safest as a disinfectant.

The discharges from the patient should all be received into vessels containing

* This disease is sometimes called "Scarlatina," "Scarlet Rash," "Canker Rash," etc.

chlorinated lime (commonly called "chloride of lime"), sulphate of iron, or some other known disinfectant,* and the same buried at once, and not by any means be thrown into a running stream, nor into a cesspool, or water-closet, except after having been thoroughly disinfected. All vessels should be kept scrupulously clean and disinfected.

Perfect cleanliness of nurses and attendants should be enjoined and secured. As the hands of nurses of necessity become frequently contaminated by the poison of the disease, a good supply of towels and two basins—one containing solution of chlorinated soda (Labarraque's solution), chlorinated lime, or other disinfecting solution, and another for plain soap and water, should be always at hand and freely used.

Persons who are attending upon children or other persons suffering from Scarlet Fever, and also the members of the patient's family, should not mingle with other people, nor permit the entrance of children into their house.

Funerals of those dying from Scarlet Fever should be strictly private and the corpse not exposed to view. To avoid mistakes, notices of such deaths in the papers should state that the deceased died of Scarlet Fever.

All persons recovering from Scarlet Fever should be considered dangerous, and therefore **should not attend school, church, or any public assembly, or use any public conveyance**, so long as any scaling or peeling of the skin, soreness of the eyes or air passages, or symptoms of dropsy remain. No person recovering from Scarlet Fever should thus endanger the public health or appear in public until after having taken four times, at intervals of two days, a thorough bath. This cleansing, however, should be deferred until the physician in charge considers it prudent. After recovery from Scarlet Fever, no person should appear in public wearing the same clothing worn while sick with or recovering from this disease, except such clothing has been thoroughly disinfected by some such method as is herein specified.

Gaseous Disinfection, or Fumigation, can be completely and entirely effectual only in the absence of living persons, as fumes strong enough for the purpose are destructive of human life. This need not deter from doing so much as is possible, without injury to sick persons, for the purification of the air of rooms occupied by them,—a liberal supply of pure air should be secured; but after the sick have recovered, the room, furniture, and other contents not to be destroyed, should be thoroughly exposed for several hours to strong fumes of chlorine gas, or to fumigation by burning sulphur; or the paper on the walls, if any, removed and burnt, the furniture scrubbed or polished, and the room thoroughly scrubbed and whitewashed.

When a room and contents are to be disinfected, all articles therein should be spread out so as to expose the greatest amount of surface to the action of the disinfectant, and all openings to the room should be closed.

To generate Chlorine, take peroxide of manganese (to be obtained at any drug store), place in an earthen dish, and add one pound of hydrochloric acid (sometimes called muriatic acid) to each four ounces of the peroxide of manganese. Care should be taken not to inhale the gas. After being certain that continuous evolution of chlorine has been secured, leave the room and close the door of exit.

The bleaching properties of chlorine may destroy the color of colored goods exposed to it, but as a disinfectant it is one of the best.

* Carbolie acid in dilute form as generally used is not believed to be a disinfectant.

To generate Sulphurous Acid gas, put live coals on top of the ashes in a metallic pan, and place on the coals sulphur in powder or fragments.

A convenient way is to place the coals and sulphur on a heated stove plate or cover turned bottom upward in a pan half filled with ashes. To disinfect 100 cubic feet of air requires the thorough combustion of about one and one-half ounces of sulphur.

Rooms should be kept closed and subjected to the action of the disinfecting gas for six or eight hours, and afterwards thoroughly aired by opening doors and windows :

Heat as a disinfectant.—It is believed that heat sufficient to be disinfectant for this disease may be secured without destroying ordinary articles of clothing, say at 240° to 250° F.

In cities and villages it may be practicable for the local boards of health to provide a central disinfecting oven or room where a large amount of material may be carried, in a closed conveyance, from houses where the disease has prevailed, and, after disinfection by heat under the direction of some competent officer of the board, returned in another conveyance to the owners. For certain articles, this may well supplement the gaseous disinfection at private houses, which cannot in every case be conveniently and thoroughly applied to all articles.

Whenever a case of this disease occurs in a locality, prompt and vigorous action should be taken for the restriction of the disease, by early isolation of those sick with the disease, and by the destruction or disinfection of all articles likely to be infected.

Plain and distinct Notices should be placed upon the premises or house in which there is a person sick with Scarlet Fever, and **no child that has not had the disease should be allowed to enter**, or to associate with persons who do enter such house or room.

Householders, Physicians, and Boards of Health, have duties to the public, some of which are specified in sections 1734, 1735, 1732, and 1695 of the Compiled Laws of Michigan, 1871, as follows :

"(1734.) SEC. 43. Whenever any *householder* shall know that any person within his family is taken sick with the small-pox or any other disease dangerous to the public health, he shall immediately *give notice thereof to the Board of Health*, or to the *health officer* of the township in which he resides; and if he shall refuse or neglect to give such notice, he shall forfeit a sum not exceeding one hundred dollars."

"(1735.) SEC. 44. Whenever any *physician* shall know that any person whom he is called to visit is infected with the small-pox, or any other disease dangerous to the public health, such physician shall immediately *give notice thereof* to the Board of Health or health officer of the township in which such diseased person may be; and every physician who shall refuse or neglect to give such notice, shall forfeit, for each offense, a sum not less than fifty nor more than one hundred dollars."

"(1732.) SEC. 41. When the small-pox, or any other disease dangerous to the public health, is found to exist in any township, the *board of health* shall use all possible care to prevent the spreading of the infection, and to give public notice of infected places to travelers, by such means as in their judgment shall be most effectual for the common safety."

(1695.) SEC. 4. The said board shall also make such regulations as they may deem necessary for the public health and safety, respecting any *articles which are capable of containing or conveying any infection or contagion, or of creating any sickness*, when such articles shall be brought into or conveyed from, their township, or into or from any vessel; and if any person shall violate any such regulation, he shall forfeit a sum not exceeding one hundred dollars."

The prompt and efficient action of local Boards of Health relative to infected clothing and other articles is further specified in sections 1710, 1711, and 1713, Compiled Laws of Michigan, 1871.

The general laws of this State provide that the mayor and aldermen of cities, and the president and council or trustees of villages, "Shall have and exercise all the powers, and perform all the duties of a board of health as provided in this chapter." This is in chapter 46, sec. (1740) 49, Compiled Laws of 1871, from which chapter all of the foregoing sections are taken. See also in Laws of Mich., 1873, the general act for the incorporation of cities, chapter XIV., sections 1, 7, and 8.

It therefore appears that, except possibly some special charter may exempt a city or village, the foregoing provisions of law are probably applicable and in force in the cities and villages, as well as in all the townships, throughout the State.

The local Board of Health and the physician in charge of cases of this disease should co-operate for its restriction. The local Board of Health should particularly guard against its spread by cases where no intelligent physician is employed.

All clothing, carpets, curtains, furniture, and other substances that are to be destroyed should be dealt with in a way to avoid conveying the poison to any person in the process; they should not be simply thrown away, or into some stream or body of water; and if burned should be completely burned, and not simply heated or dealt with in a way to diffuse the poison of the disease.

All such infected substances, which are not destroyed, should be thoroughly boiled, subjected to a dry heat of 250° F. in a closed room or disinfecting oven, or be thoroughly exposed to fumes of chlorine or of burning sulphur. Books and furs that have been used or handled by those convalescing from this disease are particularly liable to convey the poison to children who have never had the disease. Great care should be used to thoroughly disinfect any such articles that are not destroyed; and caution should be exercised before allowing children who have not had Scarlet Fever to handle any such articles that have been used by persons liable to communicate the disease.

Fresh air.—Although not so active for the destruction of the contagium as is chlorine or sulphurous acid gas, pure air, in liberal amount, is a very useful and important agent for the dilution and destruction of the poison of the disease; it should be employed freely; but with this, as with other procedures for the safety of the unaffected, great care should be taken not to increase the danger to those already sick from any cause, who are usually endangered by exposure to drafts of cold air, and this is especially true of persons convalescing from Scarlet Fever.

With the view of lessening the number of cases of and deaths from Scarlet Fever in Michigan, the foregoing is published by the STATE BOARD OF HEALTH for distribution throughout the State. Physicians being to some extent the custodians, and as a matter of fact, effective conservators of the public health, copies of this document are also sent to the physicians in Michigan, in the hope and with the expectation that they will aid in diffusing among the people such knowledge of the nature of Scarlet Fever as will enable the people better to co-operate with them and with Boards of Health for the restriction of the disease and a decrease of sickness and deaths therefrom.

Any communication upon the subject may be addressed to: OFFICE OF STATE BOARD OF HEALTH, LANSING, MICHIGAN.

Lansing, Mich., April, 1877.

Please read this with sufficient care to remember the principles involved, and then preserve it for future reference.

CIRCULAR TO HEALTH OFFICERS OF TOWNSHIPS.

After their appointment, many health officers of townships wrote to this office for an outline of their duties as "sanitary advisers." In response to these requests, a circular, intended to give them a general idea of the objects to be accomplished by local boards of health, was planned, printed, and sent to each health officer of a township. With this circular was also sent to Health Officers a blank form for a Record of cases of diseases which endanger the public health, similar to the blank for the Report of such diseases, printed on page xviii of this Report, and a blank for the use of householders and physicians in giving notice of the occurrence of such communicable diseases, printed on pages 13 and 14 of the First Annual Report of this Board. The circular was as follows:

CIRCULAR TO HEALTH OFFICERS OF TOWNSHIPS.

[19.]

OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH, }
LANSING, MICHIGAN, June, 1877. }

To the Health Officer of the Township:

SIR:—A number of Health Officers, appointed under the recent act of the legislature which provides for a health officer in every township in the State, have asked for an outline of the duties of this officer as a "sanitary adviser" of the local board of

health. In order to respond to these inquiries more fully than by the letters and documents already sent, and in anticipation of communications from others, this circular is issued.

Although as "an executive officer of the board" your power and authority to act will be only that given you by your board, as a "sanitary adviser" you should, and doubtless will, have influence in determining the action of your board, in proportion to your knowledge of sanitary science and your honest effort for the promotion of the public health.

One great object in securing a Physician as health officer was to enable each local board of health to lead and not, as too frequently heretofore, to follow the people in sanitary knowledge and action. As a rule our physicians are our leading sanitarians, and they know much better than other people what are the sources of danger to the public health in their several localities; and, as a rule, they know best how to avoid those dangers. It is therefore for the interest of the people to secure the benefits of that knowledge by paying for the services and advice of the best sanitarians, who will usually be the best physician, in their locality.

If it is true that responsibilities are in proportion to capacities and powers, then a local board of health, which, as in this State, has almost absolute power, must be held responsible for any sickness or death which might have been prevented by a proper use of its legal powers; and an individual health officer employed and paid for sanitary advice, who does not use the sanitary knowledge of which he is possessed, in a way to make it as effective as possible for preventing sickness and deaths in his vicinity, is also culpable.

There are many directions in which you can advise your local board of health how to put forth effort for lessening sickness and deaths within its jurisdiction:

I. EPIDEMICS SHOULD BE PREVENTED. This can generally be done, if local boards of health will but act efficiently in studying out and applying methods which are now practicable. One of the first requisites is that your board shall promptly receive notice of every case of communicable disease. The law makes provision therefor. See sections 1734 and 1735, Compiled Laws of Michigan, 1871. To complete the provision for such notices is one of the first duties of your board. A form of notice recommended by this State Board is herewith transmitted. It is again recommended that your board of health *have a sufficient number of such blank notices printed for the use of householders and physicians within your jurisdiction, and distribute them* in order to call attention to the law, and secure the material for a complete record in your office and in the office of the clerk of your board. The two sections of law, referred to above, should be printed on the back of each blank. You can also find the form for such blanks for notices on pages 13 and 14 of the First Report, and on pages xiii. and xiv. of the Second Report of this Board. These blanks can be purchased of W. S. George & Co., of Lansing, for one dollar per hundred.

When notice or knowledge of a case of communicable disease reaches the local board, it should act promptly for the restriction of the disease. The prominent duties in this direction are: 1, Prompt, thorough, and persistent isolation of the persons sick; 2, thorough disinfection of rooms occupied, and all articles likely to be infected, before allowing their use by other persons;* 3, as regards small-pox, the vaccination and re-vaccination of all inhabitants.

II. CASES OF DISEASES WHICH ENDANGER THE PUBLIC HEALTH SHOULD BE RECORDED. Another duty incumbent upon local boards of health is the recording of the sickness and deaths of citizens under its care, so that when grouped with records of other localities the conditions may be studied, and new methods of prevention learned from such unhappy experiences which otherwise will continually be repeated. A blank form of "Record of Diseases Dangerous to the Public Health" is herewith transmitted. You can procure similar printed sheets of W. S. George & Co., of Lansing, for eighty cents per quire or three dollars per hundred. If desired, the same dealers will bind them at usual prices. It is hoped that hereafter you will, as Health Officer, be prepared and make a record of all important facts concerning "diseases dangerous to the public health" which may come under your observation or be reported to you. Aside from the importance of such a local record, it will enable you when called upon to make a full report of such cases to this State Board,†

*For methods, see pamphlet sent to you from this office, entitled "Restriction and Prevention of Scarlet Fever."

†Act No. 81, Laws of 1873, Sec. 8: "It shall be the duty of the health physician, and also of the local board of health in each township, city, and village in this State, at least once in each year, to report to the State Board of Health their proceedings, and such other facts required, on blanks and in accordance with instructions received from said State Board. They shall also make special reports whenever required to do so by the State Board of Health."

III. MUCH SICKNESS AND MANY DEATHS FROM ORDINARY DISEASES SHOULD BE PREVENTED. A field of labor, perhaps even wider than that with the communicable diseases, is open to your local board of health; namely, the inauguration of measures for preventing sickness and deaths from the ordinary diseases in this State, a very great proportion of which being now believed by our best sanitarians to be preventable. Some of the prominent measures to be inaugurated are: 1, More thorough drainage of the soil, especially near dwellings; 2, better securities against the contamination of the water-supply, particularly in wells, by filth-saturated soil, etc.; 3, a strict guard over the purity of the air, and freedom from nuisances and unclean places; 4, better sanitary and hygienic arrangements and plans in the public schools, and in public buildings and institutions.

Although you do not, by virtue of your office as health officer, become a voting member of the local board of health, it will be possible for you to do much toward giving character to its work. Some of the powers and duties of local boards of health are specified in Chapter 46 of the Compiled Laws of Michigan, 1871. The constitution of township boards of health was lately changed, sections 1692 and 1693 being so amended as to read as follows:

(1692.) SECTION 1. In every township the township board shall be the board of health. The supervisor shall be the president, and the township clerk shall be the clerk of said board. The clerk shall keep a record of the proceedings of the board in a book to be provided for that purpose at the expense of the township.

(1693.) SEC. 2. Every township board of health shall appoint and constantly have a health officer of the township* who shall, where practicable, be a physician and sanitary adviser, and an executive officer of the board: *Provided*, That in townships where it is not practicable to secure the services of a well educated and suitable physician, the board may appoint the supervisor or some other person as such health officer. The board of health shall establish his salary or other compensation, and shall regulate and audit all fees and charges of persons employed by them in the execution of the health laws and of their own regulations. Within thirty days after the annual township meeting in each year, the board of health shall meet for the transaction of business, and shall appoint or re-appoint a health officer; and shall immediately cause to be transmitted to the Secretary of the State Board of Health, at Lansing, the full name and postoffice address of such health officer, and a statement whether he is a physician, the supervisor, or some other person not a physician. A special meeting of the board may be called by the order of the president or of any two members of said board.

The local board of health should be a center of sanitary and hygienic intelligence for its locality; its meetings should not be infrequent, and should be so managed as to encourage progress in sanitary knowledge, among its members as well as among the people. Charged with the duty of guarding the life and health of fellow citizens, the duty of members and officers of boards of health to seek out the best that is known in public hygiene and sanitary methods, seems to be plain.

Many sources of information in sanitary science and public hygiene are now accessible to those who can secure the literature of these subjects. You can doubtless find something of value, without great effort. A knowledge of some of the sources of greatest danger to life in this State may be gained by a study of the Registration Reports on Vital Statistics of Michigan, published by the Secretary of State. These are, or should be, in your township library. About one year ago, a pamphlet copy of the public health laws of this State was sent to the health officer of each township, to be delivered to the supervisor if no other health officer was appointed. The first three Annual Reports of this State Board of Health have been sent as issued, and are, or should be, in your township library. The Fourth Report will soon be sent to the township library, and it is expected that a copy can be sent to the health officer of each township. You will find something relative to work of local boards of health and health officers on pages 6, 11, 15, 16, 29, and 30 of the First Report; on pages xi., xv., xxv., xxviii., xxix. of the Second Report; on pages xliii., xlv. and 1-10 of the Third Report; and on pages xxxvi., xxxvii., 6, 7, 11-12, 127, 128, 129, and 130 of the Fourth Report.

* This act requires that "Every township board of health shall * * constantly have a health officer," and provides for calling special meetings of the board, for any purpose. If no health officer is appointed "within thirty days after the annual township meeting" it will become necessary to appoint one after that time, to fill the vacancy. Vacancies also occur whenever the incumbent of an office ceases to be an inhabitant of the district, county, township, city, or village for which he was elected or appointed an officer,—see section 617, Compiled Laws of Michigan, 1871.

Before entering upon his duties, the health officer should take and subscribe the official oath required by Sec. 1, Art. xviii. of the Constitution of this State, and file the same in the office of the township clerk.

Your local board of health has two kinds of functions: 1, To utilize for your own people the sanitary knowledge already accessible; 2, to add to the stock of such knowledge. You can do this latter by original research, by means of records of experience,—vital statistics supplying an important basis for public hygiene,—and by reporting to this board, which will then eventually be able to give to each local board the benefits of the experience of all the others. It is hoped that you will correspond freely with this Board. In case any disease appears in your locality as an epidemic, please send a Special Report of the facts to this office as soon as possible. It is hoped and expected that you will study and record the conditions coincident with the rise, progress, and decline of any such epidemic, and thus be prepared to contribute a valuable report thereof to this Board. Every such instance of suffering in your locality should be made to yield some valuable data useful for advancing the cause of public health.

By direction of the State Board of Health.

Very respectfully,

HENRY B. BAKER,
Secretary.

[Please preserve the circulars received from this office.]

CIRCULAR TO HEALTH OFFICERS OF CITIES AND VILLAGES.

In September, a circular giving an outline of the duties of Health Officers of cities and villages, similar to the one sent to Health Officers of townships, was planned, printed and sent to Health Officers of cities and villages. The ends to be accomplished were generally the same as in the townships, hence the circular was the same, excepting that the law in reference to the officers who shall constitute the board is different. For this reason the text of the circular is not repeated here, and the reader is referred for its substance to the circular to health officers of townships, just preceding.

THE PREVENTION AND RESTRICTION OF SMALL-POX.

During the outbreaks of small-pox that occurred in some parts of the State during the winter of 1876-7, the need of more general vaccination became so evident that this Board deemed it advisable to issue the following resolution. It was sent to health officers of local boards of health, and quite liberally distributed to others. The statement concerning reliable vaccine virus at the close was put in in answer to numerous letters of inquiry on the subject. The document, as sent out, was as follows:

THE PREVENTION AND RESTRICTION OF SMALL-POX.

At the regular meeting, July 10, 1877, the Michigan State Board of Health adopted the following preamble and resolution:

Whereas, By means of vaccination and revaccination the people may secure complete immunity from small-pox;

Resolved, That all local boards of health be advised and requested to direct their health physicians to offer, every year, vaccination with bovine vaccine virus to every child not previously vaccinated, and to all other persons not vaccinated within five years, without cost to the vaccinated, but at the general expense of the locality, as provided for townships in Section 1736, Compiled Laws, 1871.

(Reliable bovine vaccine virus can be obtained of Dr. George E. Ranney, Lansing, Michigan.)

Office of the
SECRETARY OF THE STATE BOARD OF HEALTH, }
Lansing, Michigan, August, 1877.

HENRY B. BAKER,
Secretary.

In addition to the documents mentioned in this Report, as having been printed during the year, many others, published previously, have been distributed during the year, such as the preceding Annual Reports, Registration Re-

ports concerning Vital Statistics, Public Health Laws, etc., etc., of which no special account has been given in this article.

CORRESPONDENCE.

A letter meets the requirements of a *particular* need somewhat in the same way that a circular meets the requirements of a *general* need; and the difference is principally in the broader or narrower field and the greater frequency of the former. It is possible in this report to do little more than to name some of the classes of information desired. The opinion of this Board, or of its Secretary, is often asked on the subject of sewerage, drainage, water-supply, ventilation, cemeteries, epidemics, nuisances, duties of health officers, construction of health laws, etc.; the reply to each of these enquiries requires to be suited to a particular occasion, and many of them require extensive reading and mature consideration before they can be properly answered. The opinion of the Attorney General was sometimes obtained on such questions of which the following, which was printed on postal cards and sent where required, and afterwards used in a circular, is an example:

Inquiries came to the office of the State Board of Health as to whether township health officers, appointed under the recent act providing for them, are required to take and subscribe the oath of office, and as to where such oath should be filed. In reply to these inquiries, the Secretary of the Board obtained the following from the Attorney General of this State:

Henry B. Baker, Secretary of the State Board of Health:

DEAR SIR:—The act of April 20, 1877, amends sections 1692 and 1693 of the Compiled Laws so as to provide for the appointment of a "health officer" by the township board of health. This act contemplates the possibility of the office being held by a person holding no other official position in the township. The act makes no provision for the taking or filing of any official oath by the "health officer." There is no general statutory provision covering the case, and the health officer is not by any law exempted from taking the official oath required by Section 1, Article XVIII. of the Constitution. I am, therefore, inclined to concur in your opinion that the "health officer" appointed under the act above named should take and subscribe the constitutional oath of office, and that the office of the township clerk is, in the absence of any statutory provision, a proper place for filing the same.

Very respectfully yours,

OTTO KIRCHNER, *Atty General.*

TREATMENT OF THE DROWNED.

During the year the document on Treatment of the Drowned has been reprinted, substantially the same in form and matter as before. The last issue had been exhausted, and they were frequently asked for. They were printed in the form of a placard, and also in pamphlet form, and were as follows:

THE TREATMENT OF THE DROWNED.

TWO THINGS TO BE DONE:—RESTORE BREATHING; RESTORE ANIMAL HEAT.

RULE 1.—Remove all obstructions to breathing.

INSTANTLY loosen or cut apart all neck and waist bands; turn the patient on his face, with the head down hill; stand astride the hips with your face towards his head, and, locking your fingers together under his belly, raise the body as high as you can without lifting the forehead off the ground (Fig. 1), and give the body a smart jerk to remove mucus from the throat and water from the windpipe; hold the body suspended long enough to slowly count ONE, TWO, THREE, FOUR, FIVE,—repeating the jerk more gently two or three times.

Fig 1.

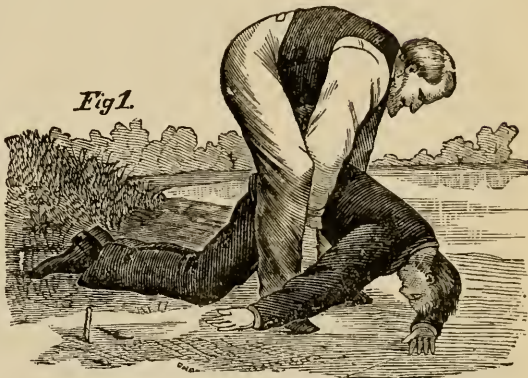
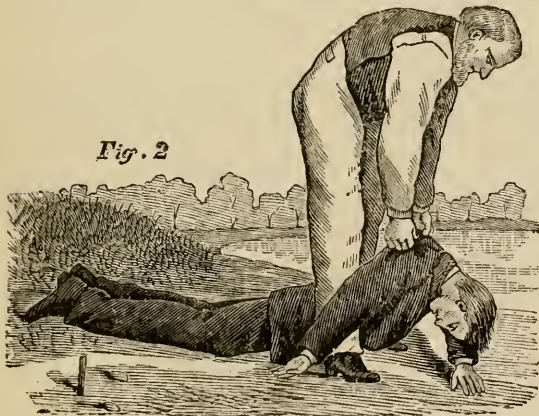


Fig. 2



RULE 2.—Place the patient face downward, and maintaining all the while your position astride the body, grasp the points of the shoulders by the clothing, or, if the body is naked, thrust your fingers into the armpits, clasping your thumbs over the points of the shoulders, and raise the chest as high as you can (Fig. 2) without lifting the head quite off the ground, and hold it long enough to slowly count ONE, TWO, THREE. Re-

place him on the ground, with his forehead on his flexed arm, the neck straightened out, and the mouth and nose free. Place your elbows against your knees, and your hands upon the sides of his chest (Fig. 3) over the lower ribs, and press downward and inward with increasing force long enough to slowly count ONE, TWO. Then suddenly let go, grasp the shoulders as

Fig. 3.



before and raise the chest (Fig. 2); then press upon the ribs, &c. (Fig. 3). These alternate movements should be repeated 10 to 15 times a minute for an hour at least, unless breathing is restored sooner. Use the same regularity as in natural breathing.

RULE 3.—After breathing has commenced, RESTORE THE ANIMAL HEAT. Wrap him in warm blankets, apply bottles of hot water, hot bricks, or anything to restore heat. *Warm the head nearly as fast as the body, lest convulsions come on.* Rubbing the body with warm cloths or the hand, and slapping the fleshy parts, may assist to restore warmth, and the breathing also. If the patient can SURELY swallow, give hot coffee, tea, milk, or a little hot sling. Give spirits sparingly, lest they produce depression. Place the patient in a warm bed, and give him plenty of fresh air; keep him quiet.

BEWARE!

AVOID DELAY. A MOMENT may turn the scale for life or death. Dry ground, shelter, warmth, stimulants, etc., at this moment are nothing,—ARTIFICIAL BREATHING IS EVERYTHING,—is the ONE REMEDY,—all others are secondary.

Do not stop to remove wet clothing before efforts are made to restore breathing. Precious time is wasted, and the patient may be fatally chilled by exposure of the naked body, even in summer. Give all your attention and effort to restore breathing by forcing air into, and out of, the lungs. If the breathing has just ceased, a smart slap on the face or a vigorous twist of the hair will sometimes start it again, and may be tried incidentally, as may, also, pressing the finger upon the root of the tongue.

Before natural breathing is fully restored, do not let the patient lie on his back unless some person holds the tongue forward. The tongue by falling back may close the windpipe and cause fatal choking.

If several persons are present, one may hold the head steady, keeping the neck nearly straight; others may remove wet clothing, replacing at once clothing which is dry and warm; they may also chafe the limbs, and thus promote the circulation.

Prevent friends from crowding around the patient and excluding fresh air; also from trying to give stimulants before the patient can swallow. The first causes suffocation; the second fatal choking.

DO NOT GIVE UP TOO SOON: You are working for life. Any time within two hours you may be on the very threshold of success without there being any sign of it.

In suffocation by smoke or any poisonous gas, as also by hanging, proceed the same as for drowning, omitting effort to expel water, etc., from windpipe.

In suspended breathing from effects of chloroform, hydrate of chloral, etc., proceed by Rule 2, taking especial pains to keep the head very low, and preventing closure of the windpipe by the tongue falling back.

The foregoing Methods and Rules, devised and prepared by the **Committee on Accidents, etc.,** being a modification of Rules furnished by Dr. Beech of

Coldwater, and of those published by the Life Saving Society of New York, have been adopted and printed by the STATE BOARD OF HEALTH of Michigan, for distribution throughout the State as a life-saving measure. Any communication upon the subject may be addressed to OFFICE OF STATE BOARD OF HEALTH, LANSING, MICHIGAN.

Please fasten this up in a conspicuous place.

Study it thoughtfully, in order to act efficiently if occasion requires.

During the year, in addition to the six thousand copies printed by this Board, the electrotype plates for illustrating the document were lent to J. F. Baldwin, M. D., editor of the Ohio Medical Recorder, Columbus, Ohio, and to G. B. Balch, M. D., Health Officer of Yonkers, N. Y.; and new electrotype plates were procured from the woodcuts in the possession of this office for S. C. Stacy, editor of the Tecumseh Herald, Tecumseh, Mich., and for J. T. Reeve, M. D., Secretary of the Wisconsin State Board of Health, each of whom printed an extensive edition for distribution in their respective localities. This shows that the document is appreciated not only in this but in other States. Evidence is continually being received that the work already done in this direction is bearing good fruit. The following cases are printed as examples:

The documents issued by this Board occasionally do good outside the State. A young man who had received one of our documents on "Treatment of the Drowned," was present at Atlantic City, New Jersey, when a person apparently dead from drowning was taken from the water, and prompted and instructed by the document, he succeeded in his efforts for resuscitation.

Dr. J. L. Lanterman, formerly of Lansing, resuscitated a girl about five years of age who had fallen into the river back of his residence, the girl having apparently drowned, fallen to the bottom of the river, and floated down stream about five rods. I do not remember all the details, but this will give an idea of the time that elapsed, as he was notified by children, went to the river, made search and found the body of the girl, and resuscitated her by shaking and rolling the body and inflating the lungs by artificial means.

The following is a copy of a communication received from J. McDermott, Collector of Customs at Bay City, Michigan:

CUSTOM HOUSE, BAY CITY, March 10, 1877.

H. B. BAKER, *Secretary, etc.:*

DEAR SIR:—I would like to trouble you for a few more cards of your "Treatment of the Drowned." I have distributed those received last season, and I am glad to say, with some good results. On one occasion I was an eye witness, and took part in the operation, when a deck hand fell from the steamer Dunlap and was said to have been in the water over fifteen minutes, life gone, body turned perfectly black when taken out of the river, and by adhering strictly to your mode of treatment, within a space of fifteen or twenty minutes, the man was breathing freely and talked. He was moved to a boarding house where he died in twenty-four hours afterwards; said to be from want of proper care.

Truly yours,

J. McDERMOTT.

REPORT OF SECRETARY RELATIVE TO PROPERTY, ETC., FOR THE
FISCAL YEAR ENDING SEPTEMBER 30, 1877.

To the President and Members of the Michigan State Board of Health :

GENTLEMEN:—In compliance with Section 5 of Article II. of the by-laws of this Board, the following report of the “nature and amount of property belonging to the Board, which has been received, issued, expended, and destroyed since the last report, and of the property remaining on hand, and also in whose care each item of property is entrusted,” is respectfully submitted.

For an account of the instruments and articles of similar nature which were on hand at the time of making the last report, you are respectfully referred to that report (pages xiv. and xxvii. of the last published Report,—for 1876). Since that time articles of this class have been purchased as follows :

- 1 Water pitcher and goblet.
- 2 Ink stands.
- 2 Mucilage stands.
- 2 Electrotype plates,—North Lansing.
- 2 Electrotype plates,—Ventilation Railroad Cars.
- 1 Letter-balance scale.
- 1 Hatchet.
- 1 Screwdriver.
- 1 Barometer (No. 2252).
- 7 Psychrometers.
- 2 Thermometers for Psychrometer.
- 1 Robinson's Anemometer.
- 1 Gibbons' Electrical Registering Apparatus for Anemometer.
- 3 Paper folders.
- 1 Ruling pen.
- 2 Steel erasers.
- 2 Keys for post-office drawer.
- 1 Hydrometer for coal oil.
- 1 Kerosene lamp.
- 1 Oil tester.
- 1 Wooden pail.
- 1 Maximum Thermometer.
- 1 Minimum Thermometer.
- 1 Galvanic cell with appliances for Anemometer, and 30 feet insulated wire.
- 1 Hammer.
- 1 “Record of Proceedings” of the Board.
- 1 “Order Book.”
- 1 “Expense Account” Book.
- 1 “Property Book.”
- 1 Book “Issues, Acceptances,” etc.
- 1 Form Book of Circulars, etc.
- 1 “Distribution of Documents” Book.
- 3 Letter Books (used but not heretofore reported).
- 1 Letter Book,—“D.”
- File Boxes.
- 1 Letter Book,—“E.”
- $\frac{1}{2}$ doz. Indexed Blank Books (used for memoranda).

The following is a list of articles purchased and used by the Board from time to time, but never before included in the Secretary's report of property: Bottle for water.—Condemned, as used and useless, by the Board, July 10, 1877.

2 jugs for water.—Condemned, as used and useless, by the Board, July 10, 1877.

2 jugs.—Condemned, as used and useless, by the Board, July 10, 1877.

Wall paper.—
Wall paper.—
Wall paper.—
Wall paper.—

Bound up as "Shadows from the Walls of Death," and placed in Public Libraries throughout the State.

4 Ferro-type plates.—(Illust. Treatment of Drowned.) Condemned, as used and useless, by the Board, July 10, 1877.

Drawing of plan, representing ventilation for "Hygiene of School Buildings."—Used by engravers.

Model to illustrate car ventilation.—Condemned, as used and useless, by the Board, July 10, 1877.

Drawing for cut for illustrating R. R. car ventilation.—Used by engravers. Oil can.—

Bottle for naphtha.—

House & Perkins' Lamp.—

12 hand-lamps, complete.—

4 Flat Founts (lamps).—

2½ gals. W. W. oil.—

½ doz. "Pioneers" (lamps).—

For special investigations relative to illuminating oils.—Condemned, as used and useless, by the Board, July 10, 1877.

A psychrometer has been placed in the hands of each of the following persons:

William C. West, M. D., Monroe.

J. S. Caulkins, M. D., Thornville.

H. T. Calkins, M. D., Fyfe Lake.

Lee S. Cobb, Nirvana.

J. S. Reeves, M. D., Niles.

Edwin Stewart, M. D., Mendon.

Dr. E. Hause, Tecumseh.

A wet-bulb thermometer for a psychrometer has been loaned to Lyman P. Alden, Superintendent, State Public School, Coldwater. A rain gauge, with accompanying measure, has been loaned to John S. Caulkins, M. D., Thornville; also one to A. W. Nicholson, M. D., Otisville, and a maximum and a minimum thermometer have been loaned to F. W. Higgins, Superintendent Woodmere Cemetery, Detroit,—the above mentioned persons all being Meteorological Observers for this Board.

Sixteen lamps purchased by Dr. Kedzie, for experiments with illuminating oils, were condemned by the Board, July 10, 1877, as "used and useless."

The remaining articles are in the office of the Secretary.

BOOKS AND OTHER PUBLICATIONS.

Books and other publications have been received and placed in the library during the year, or previously and not heretofore acknowledged, as follows:

BY PURCHASE:

Duffey on the Relation of the Sexes.

Smith on Diseases of Children.

Rumsey on Fallacies in Statistics.

W. W. Hall on Health and Disease.
 Wells on Diseases of the Eye.
 Wilson's Hand-book of Hygiene.
 Waring's A Farmer's Vacation.
 Flint's Phthisis.
 Rutherford's Histology.
 Chauvenet's Trigonometry.
 Chaumont's Lectures on State Medicine.
 Wilder on What Young People Should Know.
 Parkin on Climate and Phthisis.
 Dunglison's Medical Dictionary.
 Hassall on Food Adulterations.
 Blyths' Dictionary of Hygiene and Public Health.
 Seguin's Medical Thermometry.
 Wanklyn and Chapman on Water Analysis.
 Walker on Grave Yards.
 Official Post-office Guide, October, 1876.
 First Help in Accidents and Sickness.
 Spon on Water Supply.
 Reynolds on Sewer Gas.
 French on Farm Drainage.
 Hughes on Water Supply.
 Waring on Earth Closets.
 McDonald on Examination of Drinking Water.
 Madden on Health Resorts of Europe and Africa.
 Bartholow's Materia Medica and Therapeutics.
 Hospital Construction and Organization.
 Parkes on Public Health.
 Soule and Wheeler's Manual of Spelling and Pronouncing.
 Dempsey on Drainage.
 Brown on Medical Jurisprudence of Insanity.
 Radcliff on Vital Motion.
 Loring on Determination of the Refraction of the Eye.
 Dunham on the Theory of Medical Science, 2 copies.
 Trans. Pathological Society of New York, Vol. 1.
 Use and Abuse of Tobacco, and Place and Power of Alcohol.
 Bennett on Nutrition in Health and Disease.
 Kollmyer's Chemia Coartata.
 Anstie on Stimulants and Narcotics.
 Tyson on the Cell Doctrine.
 Bigelow on Nature in Disease.
 Letterman's Medical Recollections of the Army of the Potomac.
 Bennet's Winter and Spring on the Mediterranean.
 Hobb's Hand-book of Botany.
 Gregory on Eruptive Fevers.
 Marsh's Hand-book of Rural and Sanitary Science.
 Slagg on Sanitary Work in Villages.
 Tilden's Text Book of Chemical Philosophy.
 Flint's Manual of Percussion.
 Flint's Text Book of Physiology.
 Von Bezold on the Theory of Color.

- The Popular Science Monthly, for 1877.
 Nature, for 1877.
 The Practitioner, for 1877.
 The Sanitary Record, for 1877.
 Public Health, for 1877.
 The London Lancet, for 1877.
 The Detroit Medical Journal, for 1877.
 Van Nostrand's Engineering Magazine, for 1877.
 The American Journal of Medical Sciences, 1877.
 The Medical News and Library, 1877.
 The Monthly Abstract of Medical Sciences, 1877.
 Huxley's Lay Sermons.
 Spencer's Principles of Biology, 2 vols.
 Bernstein on the Five Senses of Man.
 The New Chemistry, Cooke.
 Van Beneden on Animal Parasites and Messmates.
 Baird's Annual Record of Science and Industry, 2 vols., 1874 and 1875.
 Foster and Langley's Practical Physiology.
 Ferrier on Functions of the Brain.
 Trousseau and others, Memoirs on Diphtheria.
 Day on The Art of Discourse.
 Huth on the Marriage of Near Kin.
 Robinson on Post Nasal Catarrh.
 Phelps on What to Wear.
 Bird on Protection against Fire.
 Cleland's Animal Physiology.
 Hartley on Air.
 Chauvenet on Method of Least Squares.
 Richardson's Hygeia, A City of Health.
 Knight's Mechanical Dictionary, 3 Volumes.
 Reports Medical Officer to Privy Council of Great Britain, New Series, No. V., No. VI., and No. VII.
 List of House of Lords' Papers for Sale, 1876.
 Quarterly Returns Births, Marriages, and Deaths, England, Dec. 1876.
 Quarterly returns of Births, Marriages, and Deaths, England, No. 113, and No. 114.
 Typhoid Fever in the town and School of Uppingham.
 Encyclopædia Britannica, 9th edition, first five volumes.
- BY GIFT, EXCHANGE, ETC.
- From the Secretary of State, Michigan—*
 Joint Documents of Michigan, 1875, Vols. I. and II.
 Report Michigan Pomological Society, 1875.
 First Annual Abstract, Reports of Sheriffs Relating to Jails, Mich., 1873.
 Second Annual Abstract, Sheriffs' Reports Relating to Jails, Mich., 1874.
 Third Annual Abstract, Sheriffs' Reports Relating to Jails, Mich., 1875.
 Third Annual Abstract, Statistical Information Relative to Insane, Deaf, Dumb, and Blind, Mich., 1875.
 Fourth Annual Abstract, Statistical Information Relative to Insane, Deaf, Dumb, and Blind, Mich., 1876.
 Census of Michigan, 1874.
 Introduction, Summary, and Index to Statistics of Michigan, 1870.
 Report of the Michigan Pomological Society, 1876.

From the Smithsonian Institution—

Annual Reports Board of Regents of the Smithsonian Institution for each of the years 1863, 1864, 1865, 1866, 1867, 1868, 1869, 1870, 1871, 1872, 1873, 1874, and 1875.

Discussion and Analysis of Prof. Coffin's Tables and Charts of the Winds of the Globe.

From the Secretary of State of the United States—

Report on Chemicals, Vienna International Exhibition, 1873, by J. L. Smith.

Report on Vienna Bread, Vienna International Exhibition, 1873, by E. N. Hosford.

Report on Chemical Fertilizers, Vienna International Exhibition, 1873, by Peter Collier.

Report on Photography, Vienna International Exhibition, 1873, by C. A. Doremus.

Report on Medicine and Surgery, Vienna International Exhibition, 1873, by A. Ruppaner, M. D.

Report on Physical Apparatus, Vienna International Exhibition, 1873, by W. Gibbs.

Report on Instruments of Precision, Vienna International Exhibition, 1873, by C. F. Carpenter.

Report on Instruments of Precision, Vienna International Exhibition, 1873, by R. D. Cutts.

Report on Telegraphs, Vienna International Exhibition, 1873, by R. B. Lines.

Report on Telegraphic Communication, Vienna International Exhibition, 1873, by D. Brooks.

Report on Education, Vienna International Exhibition, 1873, by E. Seguin.

Report on Education, Vienna International Exhibition, 1873, by J. W. Hoyt.

Report on Deaf Mute Instruction, Vienna International Exhibition, 1873, by E. M. Gallaudet.

Report on Governmental Patronage of Art, Vienna International Exhibition, 1873, by E. M. Gallaudet.

Report on the Art of Printing, Vienna International Exhibition, 1873, by G. W. Silcox.

Report on Government Printing, Vienna International Exhibition, 1873, by A. H. Brown.

From the Boston Medical Library Association—

The Ambulance System, by Col. R. Delafield.

Report on Operation Law relative to Importation of Adulterated Drugs, by J. M. Bailey.

Report on Vaccination, to Am. Social Sci. Ass't'n, Oct., 1869.

Practical Remarks on "Vaccination," by F. P. Foster, M. D.

The Health of Schools, papers read before Am. So. Sci. Ass't'n, May, 1875.

Metropolitan Main Drainage, by Chas. F. Folsom, M. D.

Sanitary Legislation in England and New York, by D. B. Eaton.

Yellow Fever, by Thomas Y. Simons, M. D.

Mineral Waters and Climate of Maniton, Colorado, by S. E. Solly.

Is Consumption Ever Contagious? by Henry I. Bowditch.

- Consumption in New England, Soil-moisture one of its Chief Causes.
 Western North Carolina as a Health Resort, by W. Gleitsmann, M. D.
 The Climatology of Consumption, by S. E. Chaillé, M. D.
 Gathering and Inspection of Vegetables and Fruits, by S. C. Buscy.
 Report on Cholera, Boston City Document, No. 39.
 Report of Gas Commissioners, Boston City Document, No. 91.
 Petition of Citizens' Gas Light Company, Boston, 1874.
 Seventeenth Registration Report, Mass., 1858.
 Twenty-fourth Registration Report, Mass., 1865.
 Thirty-third Registration Report, Mass., 1874.
 Sanitary Code for Cities.
 Report of Committee on External Hygiene, National Quarantine and Sanitary Association.
 Report on Civic Cleanliness, by E. L. Viele.
 Report on Proposed Survey of the Commonwealth of Mass., by the State Board of Education.
 The Sewage of Boston, City Document No. 3.
 The Sanitary Condition of Boston.
 Fourth Annual Report of the Boston Board of Health, 1876.
 Report on the Medical Libraries of Boston, by J. R. Chadwick, M. D.
 Report on Prisons and Prison Discipline, by Mass. Board State Charities.
 Report of Cochituate Water Board for year ending April 30, 1876.
 A plea for an Ambulance System, by Henry I. Bowditch.
 Legislation and Contagious Diseases, by J. Marion Sims, M. D.
 Tent Hospitals and Training Schools for Nurses.
 Sanitary Condition of Troops in the Neighborhood of Boston.
 Cautions to Seamen and others, for Shunning Yellow Fever.
 Report on Pneumonia, by a Sanitary Commission.
 Cholera Asphyxia, Practical Observations on, by J. B. Kirk, M. D.
 Report on Registration, by E. M. Snow, M. D.
 Communication of Dr. Henry G. Clark, transmitting document on Cholera Hospital 1854, and small-pox hospital 1859-60, Boston City Document, No. 14.
 The Miller's River Nuisance, by Charles E. Avery.
 Report on School Hygiene, by D. F. Lincoln, M. D., and Hygiene in Schools and Colleges, by Alfred L. Carroll, M. D.
 Report on Supplying Charleston with Pure Water, by G. P. Baldwin and Chas. L. Stephenson.
 The Use of Chlorides of Soda and Lime, by A. G. Labarraque.
 Report on Census of Boston, 1845, by Lemuel Shattuck.
 Limited Responsibility, Discussion of the Pomeroy Case, C. F. Folsom, M. D.
 Fifth Annual Report Board of Health City of Boston, 1877.
 Thirteenth Report Trustees of the City Hospital, Boston.
 Report of Joint Special Committee on Improved Sewerage, Boston, 1877.
From the American Statistical Association—
 Forty-fourth Report Mass. State Lunatic Hospital, Worcester, 1876.
 Twenty-first Report Mass. State Lunatic Hospital, Northampton, 1876.
 Twenty-first Report Mass. State Industrial School for Girls, 1876.
 Twenty-third Report Mass. State Lunatic Hospital, Taunton, 1876.

Twenty-third Report Mass. State Primary School, Monson, 1876.
 Thirtieth Report Mass. State Reform School, Westborough, 1876.
 Forty-fifth Report of Perkin's Institution for the Blind, 1876.
 Twenty-third Report Mass. State Alms House, Tewksbury, 1876.
 Twenty-ninth Report Mass. School for Feeble-Minded Youth, 1876.
 Report on Insanity and Lunacy in Mass., 1854.
 Thirteenth Report Mass. Board of State Charities, 1877.
 Twenty-third Report Mass. State Work House, Bridgewater, 1876.
 Census of Rhode Island, 1875.
 Twenty-first Ann. Report, Births, Marriages and Deaths, Providence, R. I., 1875.

First Report Mass. State Board of Health, 1870.
 Fifth Report Mass. State Board of Health, 1874.
 Sixth Report Mass. State Board of Health, 1875.
 Third Report Board of Health, City of Boston, 1875.
 Thirtieth Registration Report, Mass., 1871.
 Thirty-third Registration Report, Mass., 1874.
 Thirty-fourth Registration Report, Mass., 1875.
 Annual Report Commissioners of Savings Banks, Mass., 1876.
 Report Board of Inspectors of Mass. State Prison, 1876.
 The Increase of Human Life, by Edward Jarvis, M. D.
 Constitution and By-Laws of the Am. Statistical Ass't'n.

From A. J. Rickoff—

Thirty-ninth Report Cleveland Board of Education, 1875.
 Fortieth Report Cleveland Board of Education, 1876.

From Geo. Troup Maxwell—

Proceedings Delaware State Medical Society, 1876.

From Geo. E. Ranney, M. D.—

Achievements in Medicine.

From this Michigan State Board of Health—

Means of Escaping from Public Buildings in Case of Fire. Pamphlet
 Reprint, by R. C. Kedzie, M. D.

Blank Pamphlet for Record of Prevailing Diseases, by Weeks. By Henry
 B. Baker, M. D.

The Entailments of Alcohol. By Homer O. Hitchcock, M. D.
 Reprint from Annual Report S. B. of H.

Vaccination. By Arthur Hazlewood, M. D. Reprint from Annual
 Report.

Report on Criminal Abortion. By Homer O. Hitchcock, M. D. Reprint.
 Epidemic of Scarlet Fever. By O. Marshall, M. D. Reprint.

Report of Attendance at American So. Sci. Ass'n, by Henry B. Baker,
 M. D. Reprint.

Water and the Water-Supply in Michigan, by A. Hazlewood, M. D. 2
 copies. Reprint.

Report on Methods of Collecting Vital Statistics, by Henry B. Baker,
 M. D. Reprint.

Report on the Water-Supply of Michigan, by R. C. Kedzie, M. D. Reprint.
 The Water-Supply of Localities in Michigan, Replies by Correspondents
 of State Board of Health. Reprint.

Ventilation of Railroad Cars, by R. C. Kedzie, M. D. Reprint.

Diseases in Michigan in 1875, Reports of Correspondents of the State Board of Health. Reprint.

Outline of Plan of Weekly Reports Prevailing Diseases, by Henry B. Baker, M. D. Reprint.

Fourth Annual Report Michigan State Board of Health for the year 1876.

Restriction and Prevention of Scarlet Fever, eight-page pamphlet, 3 copies.

From Henry B. Baker—

Death-Rate of Each Sex in Michigan. A paper prepared for the Am. Pub. Health Association. By Henry B. Baker, M. D. 2 copies.

Report of Com'r's to Examine Penal, Pauper, and Reformatory Institutions, Michigan.

The Cause of Chorea. By Henry B. Baker, M. D. 2 copies.

Legislation and Contagious Diseases. By J. M. Sims, M. D.

Illuminating Oils in Michigan. By Prof. R. C. Kedzie. 2 copies.

Annual Catalogue Medical School of Harvard University, 1867-77.

Cerebro-Spinal Meningitis, pamphlet. Report by Henry B. Baker.

Report of Com'r's and Supt. Mich. State Fisheries, 1875-6.

Special Report Com'r's Charitable, Penal, Pauper, and Reformatory Institutions, Mich.

Third Biennial Report Com'r's Charitable, Penal, Pauper, and Reformatory Institutions, Mich., 1876.

Report of Building Com'r's, State House of Correction, Ionia, Mich.

Report of Com'r's to select a site for Eastern Asylum for the Insane, Mich.

Report of Com'r's of the Eastern Asylum for the Insane, Mich., 1875-6.

Report of Trustees Michigan Asylum for the Insane, 1875-6.

A case of Puerperal Septic Fever. By Geo. J. Northrup, M. D., with remarks on the Relation of the Medical Profession to the People, by Henry B. Baker, M. D.

From Prof. C. F. Chandler—

Sanitary Chemistry of Waters, by C. F. Chandler.

From the Secretary of State, Mass.—

Law on Solemnization of Marriages in Mass.

Duties of Sextons and Undertakers.

Instructions on Registration of Births, Marriages, and Deaths in Mass.

From Chas. O. Hunt, M. D.—

Proceedings of the Maine Medical Association, 1876.

From E. Heyl & Co.—

Pamphlet Advertisement of E. Heyl & Co., Proprietors of Beaugency Cow-Pox Virus.

From L. C. Butler, M. D.—

Transactions of the Vermont Medical Society for each of the years 1864, 1865, 1866, 1867-68, 1869-70, 1871-72-73.

From Benjamin Lee, M. D.—

Transactions Penn. State Medical Society, 1876.

From G. P. Conn, M. D.—

Transactions New Hampshire Medical Society, 1876, also 1877.

From ———— :—

Ninth Annual Report of Fire Commissioners, Detroit, 1876.

State Medicine in its Relations to Insanity.

Transactions of the Convention organizing the Michigan Eclectic Medical Society.

- Fifteenth Annual Report Chicago Board of Public Works, 1875.
 Twentieth Annual Report Board Control Mich. State Reform School, 1876.
 Report of Trustees of the Maine Hospital for the Insane.
 Inaugural Address, C. M. Croswell, Gov. of Mich., 1877.
 Report of the State Swamp Land Com'rs, Mich., 1876.
 Twelfth Biennial Report Asylum for Deaf, Dumb, and Blind, Michigan, 1875-76.
 Transactions of the Texas State Medical Society, 1876.
From the Registrar General of Ontario :
 Annual Report Commissioner of Agriculture and Arts, Ontario, 1875.
From Charles Denison, M. D. :
 Transactions Colorado State Medical Society, 1876.
From Hon. Wm. B. McCreery :
 Annual Report Michigan State Treasurer, 1876.
From Harriet A. Tenney :
 Report of the State Librarian, Michigan, 1875-6.
 Catalogue of the Michigan State Library, 1877-8.
From J. R. Black, M. D., Newark, O. :
 Preventing the Extension of Syphilis, by J. R. Black, M. D.
From Lyman P. Alden :
 Third Annual Report Board of Control State Public School, Coldwater, Michigan.
From J. T. Reeve, M. D. :
 Transactions Wisconsin State Medical Society, Vol. X., 1876.
 First Annual Report Wisconsin State Board of Health, 1876.
 Law of Wisconsin, Establishing a State Board of Health.
From Hon. John Eaton :
 Report of the U. S. Commissioner of Education for each of the years 1870, 1871, 1872, 1873, 1874 and 1875.
From W. Murray Weidman—
 Report Board of Health, City of Reading, Pa., 1876.
From E. T. Caswell, M. D.—
 Twenty-third Registration Report of R. I., 1875.
From the Colorado State Board of Health—
 First Annual Report State Board of Health of Colorado, 1876.
From W. E. Anthony, M. D.—
 Communications to R. I. Medical Society, 1874-76.
 Ann. Address before R. I. Medical Society, 1875.
 Bromides: Their Physiological Effects.
From George E. Chambers—
 Report Board of Health, City and Port of Philadelphia, 1876.
From Manly Miles, M. D.—
 Close Breeding, by Manly Miles, M. D.
From Dr. J. Velder—
 Report Board of Health City of Elmira, N. Y., 1875.
From F. E. Englehardt, Ph. D.—
 Annual Report Onondaga Salt Springs, 1876.
From the Kansas Medical Society—
 Transactions Kansas Medical Society for each of the years 1875 and 1876.
From New York Hospital, J. L. Vandervoort, Librarian—
 Transactions Fourth National Sanitary Convention.

Essays on State Medicine, Rumsey.

Tredgold on Warming and Ventilating Buildings.

Christison on Poisons.

Twenty-first Annual Report Births, Marriages, and Deaths, Providence, R. I., 1875.

From Isaac N. Kerlin, M. D.—

Annual Report Penn. Training School for Feeble-minded Children, 1876.

From Prof. J. L. Cabell, M. D.—

The Richmond and Louisville Medical Journal, Oct., 1876.

From Henry Tuck, M. D.—

Annual Report Trustees Mass. School for Feeble-minded Youth, October, 1876.

From Hon. Sam'l H. Row—

Insurance Commissioner's Report relating to Stock, Fire, and Marine Insurance Companies, 1876.

Seventh Annual Report Commissioner of Insurance, 1877. Part 1. Fire and Marine.

From James Johnson, M. D.—

Tenth Annual Report Milwaukee Board of Health, 1876.

From G. A. Doren, M. D.—

Annual Report Ohio State Asylum for Feeble-minded Youth, 1876.

From John M. Woodworth, M. D.—

Report of the U. S. Marine Hospital Service, 1875.

From Thomas S. Kirkbride, M. D.—

Resolutions, etc., of the Association of Medical Superintendents of American Institutions for the Insane.

Report Penn. Hospital for the Insane, 1876.

From R. R. Livingston, M. D.—

Transactions State Medical Society of Nebraska, Sixth, Seventh, and Eighth Annual Meetings.

From C. A. Lindsley, M. D.—

Fourth Annual Report Board of Health, New Haven, Conn., 1876.

From C. T. Wilbur, M. D.—

Sixth Biennial Report Illinois' Asylum for Feeble-Minded Children, 1876.

From W. P. Reese, M. D.—

Seventh Annual Report Board of Health of Selma, Ala., 1876, 2 copies.

From Superintendent of Public Instruction, Michigan—

School Laws of Michigan, 1873.

School Laws of Michigan Enacted and Amended in 1875.

Thirty-ninth Annual Report Superintendent Public Instruction, Mich., 1875.

From D. Appleton & Co.—

Popular Science Monthly, Supplement No. 1.

From W. O. More, M. D.—

Fifty-sixth Annual Report of the N. Y. Eye and Ear Infirmary.

From A. W. Nicholson, M. D.—

Drainage, pamphlet Issued by Forest Township Board of Health.

From Hon. Thomas P. James, Comm'r of Agricult.—

Hand Book of Georgia.

From Hon. Thomas W. Ferry, U. S. Senator—

Report Board of Health, District of Columbia, 1876.

From Hon. James H. Stone, Sec'y Mich. Senate—

Address on Idiocy, by C. T. Wilbur, M. D., and Address on Heredity by T. A. McGraw, M. D.

From Ellwood Cooper—

Forest Culture and Eucalyptus Trees, by Ellwood Cooper.

From T. S. Gold—

Tenth Annual Report Connecticut State Board of Agriculture, T. S. Gold, Secretary.

From Wirt Johnston, M. D.—

Transactions Mississippi State Medical Society, 1877.

From Chas. F. Folsom, M. D.—

Eighth Annual Report Mass State Board of Health, 1877.

From James F. Baldwin, M. D.—

Ohio Medical Recorder, Vol. I., 12 numbers.

From John E. Addicks—

Health Officer's Annual Report, Philadelphia, for each of the years 1874, 1875, and 1876.

From Frank Wells, M. D.—

Fifth Ann. Report Board of Police Commissioners, Cleveland, O., 1876.

From Prof. R. C. Kedzie, M. D.—

Electrical Conduction, by R. C. Kedzie, M. D.—

From Milton G. Register, M. D.—

Transactions Medical and Chirurgical Faculty of Maryland, 1877.

From J. F. Montgomery, M. D.—

Transactions California State Medical Society, 1876 and 1877.

From Edward Searing, Supt. Pub. Instr., Wis.—

Wisconsin School Report for 1874 and 1875.

By Exchange for Publications of this Board,—the following Periodicals (in some instances incomplete):—

The Cincinnati Lancet and Observer.

The Canada Lancet.

The Sanitary Journal.

The Health Reformer.

The Ohio Medical and Surgical Journal.

The Virginia Medical Monthly.

The American Medical Bi-Weekly.

The Scientific Farmer.

The American Exchange and Review.

The American Observer, from March.

The Chicago Medical and Surgical Journal, from July.

Excepting certain publications drawn out by members of the Board, the foregoing, together with those accounted for as in the Library of the Board, and drawn out by members at the date of the last Report, are in the Library of the Board, and are in good condition. Those drawn out are as follows:

By Prof. R. C. Kedzie:

Communications of the Rhode Island Medical Society for 1876-77.

The Sanitary Record for July 13, 1877.

Tenth Annual Report Milwaukee Board of Health.

By Homer O. Hitchcock, M. D. :

Galton's English Men of Science.
Huth on the Marriage of Near Kin.
Carpenter's Mental Philosophy.

By Henry F. Lyster, M. D. :

Chaumont's Lectures on State Medicine.
Braun on Baths.
Walton on Mineral Springs.
Separate System of Drainage.
Waring on Draining for Profit and Health.
French on Farm Drainage.
Elkinton on Drainage.
Eassie's Sanitary Dwellings.
Fothergill's Maintenance of Health.
Reid on Ventilation.
Zehfuss' Pneumatic Sewerage.
Latham's Sanitary Engineering.
The Public Health, June 9, 1876, and Aug. 10, 1877.
Sanitary Record, Aug. 10, 1877.
The Popular Science Monthly, September, 1877.
Virginia Medical Monthly, Feb., 1876.
The Public Health, June 9, 1876.
Eassie's Healthy Homes.
Metcalf's Sanitas Sanitatum et Omnia Sanitas.
Parson's Sea-Air and Sea-Bathing.

By Hon. LeRoy Parker :

Parke's Hygiene.
The Medical Jurisprudence of Insanity.
Fifth Annual Report Mass. State Board of Health, 1874.
Eighth Annual Report Mass. State Board of Health, 1877.
Sanitary Legislation in England and in New York, by D. B. Eaton.
A Farmer's Vacation, by Waring.
Preventing the Extension of Syphilis.
Abstract of Report on Health Laws, by E. Harris.
Report of the Medical Officer of the Privy Council, England, No. IV.

By Dr. Henry B. Baker :

Chauvenet on Method of Least Squares.
VonBezold on The Theory of Color.

By Arthur Hazlewood, M. D. :

Smith on Diseases of Children.
Dalton's Physiology.
Jacobi on Infant Diet.

By Rev. J. S. Goodman :

Report Relative to Philadelphia Public Schools, 1875.
American Medical Weekly, July 8, 1876.

By Dr. A. W. Nicholson, Otisville, Mich. :

Fox on "Ozone and Antozone."

By F. S. Kedzie :

Duffey on Relation of the Sexes.
Wilder on What Young People Should Know.

Of hard paper, there was on hand at the time of making the last report, 8 reams and 120 sheets of Folio Post, about 1 ream of Crown, about $\frac{2}{3}$ ream Demy, about 450 sheets Blue Cover paper, about $1\frac{1}{4}$ reams Manilla wrapping paper, and about $\frac{3}{4}$ ream Tea Cover paper. Since that time there have been purchased 10 reams of Folio Post, 6 reams of Crown, 3 reams Demy, 2 reams Cover paper, and 2 reams Manilla wrapping paper. There is now on hand 6 reams 32 sheets of Folio Post, 273 sheets of Crown, 2 reams and 270 sheets of Demy, about 1 ream and 450 sheets Manilla wrapping paper, about 297 sheets Blue Cover paper, and about 267 sheets of Light Green Cover paper. This shows that during the year there have been used 12 reams and 98 sheets of Folio Post, 6 reams and 210 sheets Crown, about 1 ream and 50 sheets Demy, about 2 reams and 100 sheets of Cover paper, and about 1 ream and 150 sheets Manilla wrapping paper.

KIND OF PAPER.	FOLIO- POST.	CROWN.	DEMY.	BLUE COVER.	TEA COVER.	GREEN COVER.
R=REAMS. S=SHEETS.	R. S.	R. S.	R. S.	R. S.	R. S.	R. S.
On hand Oct. 1, 1876, and purchased during the fiscal year 1876-7.....	18-120	7-00	3-320	0-450	0-403	2-000
On hand Oct. 1, 1877.....	6- 32	273	2-270	0-297	0-000	267
Am't used by State Printer and Binder, as shown by the books of this office	11-439	6-139	0-453	0-127	0-403	1-150
Used in office, bad sheets, etc.....	0-119	0-77	0-77	0-26	0-000	0-63

This has been used as follows: Of the Folio Post, 7 reams and 294 sheets were used for circulars and printed letters, 2 reams and 473 sheets were used for blanks, and 1 ream and 170 sheets were used for making letter paper for the use of the office. The Crown has been used for making blanks for report and record of diseases dangerous to the public health, and for Anemometer registers. The Demy has been used for making a book of "Issues, Acceptances, etc.," for the use of the office, for note and letter paper, and for placards on "Treatment of the Drowned." The Tea and Green Cover paper has been used for making covers to thirteen pamphlet reprints from the Fourth Annual Report of this Board, and the Manilla wrapping paper has been used for wrapping up reports and documents sent out from the office. The specific items for which the paper has been used may be found in detail in the "Order Book" of this office.

Of writing paper there was on hand at the time of making the last report, about 80 sheets plain letter, 50 sheets foolscap, and 3,400 sheets and half-sheets note and letter paper with printed heads. Since that time there have been purchased 1 ream ruled letter, 1 ream foolscap, 1 ream legal cap, and manufactured from folio post and demy paper furnished by this office 2,000 sheets and half-sheets letter paper with printed heads. Total purchased and on hand, 6,970. Letter paper has been issued during the year as follows: To Prof. R. C. Kedzie, 292 sheets and half-sheets; to Dr. H. O. Hitchcock, 48 sheets legal cap and 260 sheets note and letter; to Dr. H. F. Lyster, 225 sheets and half-sheets letter; to Hon. LeRoy Parker, 130 sheets and half-sheets note and letter; to Rev. D. C. Jakes, 130 sheets and half-sheets note and letter. There is now on hand about 2,840 sheets and half-sheets printed note and letter, 414 sheets legal cap, 312 sheets plain letter, and 384 sheets foolscap. Total issued and on hand, about 5,000 sheets and half-sheets.

This shows that during the year about 2,000 sheets and half-sheets of writing paper of the different sorts have been used in this office. It has been used mainly in carrying on the correspondence, and for making manuscript.

Of envelopes there were on hand, at the time of making the last report, about 12,350; 34,000 have since been purchased, making a total of 46,350. There are now on hand about 22,735, thus showing that during the year about 23,615 have been used. Of these, about 1,200 were used in sending out blanks for report of "diseases dangerous to the public health" to Clerks of Local Boards of Health; about 300 were used in sending the Circular to Correspondents on Prevailing Diseases, 1876; for sending 8-page pamphlet on "Restriction and Prevention of Scarlet Fever" to Presidents, Clerks, and Health Officers of Local Boards of Health, Physicians, Newspapers, Civil Officers, Legislators, Judges, Justices, School Superintendents, and Sanitarians in Michigan, about 14,787; for sending circulars to supervisors, transmitting copy of law requiring the appointment of health officers, with envelope for return, about 3,000; for sending circular to Correspondents relative to Scarlet Fever, with return envelope, about 300; for sending Circular [19] to Health Officers, to Health Officers and others, about 1,500; for sending circular relative to Health Officers to common councils of cities and villages, with envelope for return, about 350; for sending Dr. Lyster's Circular on Baths and Bathing to Correspondents and Members, with envelope for return to Dr. Lyster, 223; and for sending Dr. Lyster's Circular relative to Drainage, etc., to Correspondents and Members, with return envelope to Dr. Lyster, 223; total, 21,883. The remainder—1,732—has been used in carrying on the ordinary correspondence of the office.

At the date of the last report there was on hand \$11.84 worth of postage. Vouchers for postage and box-rent have been allowed during the year to the amount of \$608.24, making a total of \$620.08. There is now on hand postage stamps, etc., to the amount of \$98.73. This shows that during the year the cost of postage and box-rent has been \$535.34.

Some of the principal items of postage have been as follows:

For sending out Annual Reports about.....	\$170.00
For sending out document on Restriction of Scarlet Fever.....	120.00
For postal cards printed for reporting diseases (some of which are yet unused).....	44.00
For postal cards printed for receipts to and from this office (some of of which are yet unused).....	19.00
For stamped envelopes sent to correspondents, etc.....	10.68

Thus far this report has given, in most instances with exactness, in a few approximately, the amount of each kind of property received, on hand, and disposed of, by this office during the year ending Sept. 30, 1877; but in order to show exactly how much has been expended for all items of property and for all other purposes during the time specified, the following statement is here presented. It includes vouchers numbers 219 to 288 inclusive.

AMOUNT OF EXPENDITURES BY THE STATE BOARD OF HEALTH, AS PER VOUCHERS
NUMBERS 219 TO 288 INCLUSIVE.

Chemical Analyses	\$10.00
Engraving, Drawing, etc.....	103.00
Expenses of Members { Attending Meetings.....	135.20
{ Other Official.....	135.15

Instruments and Books.....	\$458.71
Paper, Stationery, etc.....	277.68
Postage { Office.....	608.24
{ Members.....	10.25
Printing and Binding.....	451.50
Secretary.....	2,000.00
Special Investigations.....	81.21
Miscellaneous.....	53.37
Total.....	*\$4,324.31

Respectfully submitted,

HENRY B. BAKER,
Secretary.

Having compared the Secretary's annual report of property, received, issued, expended, and destroyed during the fiscal year ending Sept. 30, 1877, with the property-book and the record of proceedings, and having examined the foregoing account of expenditures, and compared the same with the books in the Auditor General's office, I find the same to be correct.

LEROY PARKER,
Committee on Finance.

LANSING, Oct. 10, 1877.

ABSTRACTS AND BRIEF ACCOUNTS OF THE PROCEEDINGS AT THE MEETINGS OF THE STATE BOARD OF HEALTH DURING THE YEAR ENDING SEPTEMBER 30, 1877.†

Regular Quarterly Meeting, Oct. 10, 1876.

The Board met at Lansing, in the office of the Secretary of State, the following members being present: Homer O. Hitchcock, M. D., President; R. C. Kedzie, M. D.; Rev. Chas. H. Brigham, and Henry B. Baker, Secretary.

Dr. Kedzie presented a report upon the "Water-Supply of Michigan," in accordance with a request of the Board made at its meeting in October, 1874 (see page ix. of the Third Annual Report), which was accepted with thanks and ordered published in the Annual Report. [See Fourth Annual Report, pages 109-119.]

Dr. Baker presented material for his paper on the "Death-Rate as Influenced by Age, Climate, etc.," consisting of tables, charts, diagrams, etc., and mentioned that he had found a way in which a comparison of the death-rates of different localities could be made without the necessity of computing a "life-table" for each locality.

Dr. Arthur Hazlewood came in and took his seat as a member of the Board.

Dr. Hazlewood, committee on Food, Drinks, and Water-Supply, read a paper entitled "Water, and the Water-Supply in Michigan."

On motion of Dr. Kedzie, the paper was accepted with thanks and ordered published in the Annual Report. [See Fourth Annual Report, pages 73-80.]

Dr. Hitchcock presented and read a paper upon "Criminal Abortion", and reported back letters and questions from Drs. Beech and Stoddard, previously referred to the committee on Legislation in the Interests of Public Health.

* This is for the fiscal year; the amount for the calendar year cannot exceed \$4,000, the total appropriation for each calendar year.

† Regular meetings occur on the second Tuesday of January, April, July, and October, in each year.

On motion, the paper was accepted for publication in the Annual Report. [See Fourth Annual Report, pages 55-62.]

Dr. Hazlewood read a statement relative to the State Public School at Coldwater, referring to the Ventilation, Water-Supply, etc.

Dr. Hitchcock presented a report of his attendance at the International Medical Congress in Philadelphia, September 4 to 9, 1876, in which he mentioned and briefly reviewed many of the papers read, and concluded by saying that the Congress was a great success, and that its published transactions should be read by every physician and sanitarian in the land.

On motion, the report was accepted and placed on file.

Dr. Baker read a report of his attendance at the meeting of the Health Department of the American Social Science Association, at Saratoga, September 8, 1876.

On motion, the report was accepted with thanks, and was approved for publication in the Annual Report. [See Fourth Annual Report, pages 65-70.]

Two documents relating to Scarlet Fever, which had previously been submitted to the members for approval, but had not been approved, were brought up for discussion. One of them, a proposed circular to correspondents asking for statements of cases, etc., illustrating the dissemination of the disease was read, and amendments were offered, and finally the circular as amended was adopted. The document of instructions to local boards of health, householders, etc., prepared by Dr. Hazlewood, was read, and considerable discussion was given to the subject. Dr. Hazlewood's views were to give a few short explicit directions, while Dr. Baker favored the plan of making the document a complete schedule of instructions to local boards of health, such as would allow newspapers, and persons who understand the complete directions, to abstract or omit what each saw fit. After further discussion, Drs. Hazlewood and Baker were made a special committee to prepare and issue the document above mentioned.

Dr. Baker, to whom was referred that portion of the President's Annual Address which related to the collection of Vital Statistics, presented and read a report on "Methods of Collecting Vital Statistics."

On motion, the report was accepted for publication in the Annual Report. [See Fourth Annual Report, pages 123-130.]

On motion, Drs. Baker and Hitchcock were appointed a committee to draw up a bill for the amendment of the laws of this State for the collection of vital statistics, and to report to the Board at its next meeting.

The Secretary read his report of property, received, issued, used, and on hand, during the half-year ending September 30, 1876, in accordance with the requirements of the By-Laws of the Board. [See Fourth Annual Report, pages xxvii-xxxi.]

The report was referred to the Committee on Finance.

Bills were audited—vouchers 219-230 inclusive.

The Secretary read a report of the principal items of work in the office during the quarter just closed.

A communication from J. H. Beech, M. D., relative to the drowning of nine persons in Baw-Beece Lake, was read, and, on motion, accepted with thanks.*

The Secretary mentioned the receipt of a letter from Dr. Zenas E. Bliss, late

*The drowning was caused by the careless overloading of a boat; and Dr. Beech suggested that in order to prevent such accidents, the carrying capacity of such conveyances should be required to be plainly and conspicuously marked on them, and that they should be required to be supplied with signals, etc.

member of the Board, relative to the rapidly failing condition of his health. Regret was manifested by the members present and, on motion, the Secretary was requested to communicate to Dr. Bliss an expression of sympathy and kind wishes of the members of the Board.

Dr. Baker read a paper on the "Cause of Chorea."*

A communication from J. H. Beech, M. D., relative to Diphtheria at Union City, Michigan, was read, and, on motion, the Secretary was directed either to visit the locality himself and study and report the conditions, or get Dr. Beech to do so.

A communication from J. H. Beech, M. D., relative to the fatal poisoning of a young man by Paris green, was presented.

After informal discussion relative to material for the Annual Report, the Board adjourned.

Regular Quarterly Meeting, January 9, 1877.

The Board met in the Old State Capitol at Lansing, the following members being present: Rev. J. S. Goodman, Prof. R. C. Kedzie, Doctor Arthur Hazlewood, and Henry B. Baker, Secretary.

On motion of Dr. Kedzie, Rev. J. S. Goodman was elected President *pro tem*.

The minutes of the preceding meeting were read and, after being corrected in one particular, were approved.

Dr. H. F. Lyster had sent in a paper on "The Locating of Healthful Homes," which was read by the Secretary.

Dr. Kedzie presented and read a report relative to the present condition of Illuminating Oils in this State, and the methods of manufacture of such oils as witnessed by himself at Cleveland, Ohio. On motion, the paper was accepted with thanks and referred back to the author with the request to prepare it for publication in the Annual Report. [See pages 69-80 of this volume.]

The Secretary presented a report sent in by Dr. Hitchcock, Committee on Legislation, the same being the form of a memorial to the Legislature for the appointment of a Commission to collect facts and statistics relating to the sale and use of alcoholic beverages, the losses to the State thus entailed, the influence on the Vital Statistics, etc.

At the afternoon session the same members were present as in the morning, and also Dr. H. F. Lyster and Rev. C. H. Brigham.

Dr. Kedzie read a letter from Mr. Coleman, Deputy Oil Inspector at Kalamazoo, mentioning difficulties in prosecuting under the present law for the inspection of oils, and suggesting some amendments.

Mr. Perry Averill, State Inspector of Illuminating Oils, by invitation, appeared and read a report of the progress he had made in oil inspection in this State, and his methods of executing the law, which also contained reports of deputy inspectors, giving number of barrels inspected, etc.—[See pages 85-90 of this volume]. Considerable discussion followed as to the desirability of securing certain changes in the law, the necessity of observing caution in so doing, and also the fact that the mortality from so-called kerosene accidents had been greatly reduced since the present law had been in effect.

The following resolution was adopted:

Resolved, That a committee, of which Dr. R. C. Kedzie shall be chairman, be appointed by the chair to take such steps as circumstances may require to

* The cases mentioned, and the arguments adduced, support the view that chorea may be caused by nervous irritation, tending to excessive muscular fatigue, in any part of the body.

furnish the Legislature with any information in the possession of this Board regarding the working of the law concerning illuminating oils in this State, and to act for the Board in maintaining the present standard of inspection, so far as regards the flash-test.

The following resolution was also adopted :

Resolved, That the great reduction, since the present system of State inspection of illuminating oils has been in force, in the number of casualties from lamp explosions and otherwise, through the use of the low-grade illuminating oils, is an indication of the value of such inspection and of the present test.

Rev. C. H. Brigham made a report upon a subject referred to him at a previous meeting, namely, the sanitary influence of the Eucalypti, particularly the *Eucalyptus globulus*. He read several letters and newspaper scraps upon the subject, and stated that Prof. Asa Gray thought the tree could not be made to grow in this State, on account of the cold climate. Dr. Lyster stated that the trees were growing in Detroit, having been made to do so by being cut back.

The Chairman announced that he had appointed Dr. H. B. Baker, as the member of the committee on oil inspection, of which Dr. Kedzie was made chairman.

The Secretary reported that in accordance with the direction of the Board he had secured the services of Dr. J. H. Beech of Coldwater to investigate the outbreak of diphtheria at Union City, and that his report would be forthcoming soon. [See pages 354-356 of this volume.]

The Secretary read a communication from Dr. O. Marshall, of North Lansing, on "Opium Eating." On motion the paper was accepted with thanks and referred back to the author with the request to prepare it for publication in the Annual Report.

The Secretary read a proposed bill by Dr. Milton Chase, of Otsego, relative to physicians' qualifications, providing that persons who practice medicine in this State shall file with the County Clerk sworn statements of the studies they have pursued and the advantages they have had. On motion, the document was referred to the committee on legislation.

The Secretary submitted a report of the principal items of work in his office during the quarter.

The Secretary read a communication from W. H. Rouse, M. D., of Detroit, suggesting that the State Board of Health and State Agricultural College should coöperate in the propagation of Bovine Vaccine Virus, for the use of physicians practicing in this State. The communication was referred to the committee on Epidemic, Endemic, and Contagious Diseases.

On motion, the Secretary was authorized to distribute psychrometers and other meteorological instruments, in accordance with his best judgment, to such of the meteorological observers as have furnished and will continue to furnish valuable data to the Board.

Names of persons proposed as regular correspondents were read, and the Secretary was authorized to ask certain persons to serve in that capacity.

The Secretary read a proposed Circular [16] to the Health Officers of certain cities in Michigan. The Circular was adopted [see page xxvi. of this volume].

On motion, the Secretary was directed to prepare and publish a statement of the principal meteorological conditions in each year.

The Secretary offered a suggestion that it should be made the duty of some

officer of each local board of health to prosecute for failure to report diseases dangerous to the public health. The subject was referred to the committees on "Legislation" and "Contagious Diseases," jointly.

Bills were audited—vouchers 231-249 inclusive.

On motion, the Board adjourned.

Regular Quarterly Meeting, April 10, 1877.

The Board met in the office of the Secretary of State, the following members being present:

Homer O. Hitchcock, M. D., President.

R. C. Kedzie, M. D.

Rev. C. H. Brigham.

Henry B. Baker, Secretary.

Dr. Lyster was present at the afternoon session.

Dr. Hitchcock presented his annual address, as President, by title only, as follows: "The Laws of Heredity in their relation to Public Health, and to Legislation in the interests of Public Health." [See pages 1-19 of this volume.]

The Secretary read a report sent in by Dr. Arthur Hazlewood, Committee on Epidemic Diseases, etc., on the subject of Bovine Vaccine Virus, and the proposition of Dr. Rouse of Detroit that the Board and the Agricultural College coöperate in its propagation. The Report did not favor the proposition. It was as follows:

To the State Board of Health:

GENTLEMEN:—The communication from W. H. Rouse, M. D., Detroit, suggesting that the State Board of Health coöperate with the State Agricultural College in the propagation of bovine virus for the use of physicians practicing in this State, has been taken into consideration by your committee, and considered inexpedient, for reasons set forth by the Committee on Public Health of the State Senate, to wit: that such propagation of bovine virus would entail a cost upon the State Treasury, without corresponding benefit to the citizens of the State, and that the virus thus obtained, if sold at cost to physicians, would cost them more than they can now obtain a reliable article for elsewhere. And further, that it is not the province of an advisory Board (such as the State Board of Health is by the terms of the law which created it) to become part of a commercial agency, such as it must necessarily assume by entering into such an arrangement.

Your committee would, therefore, recommend that, inasmuch as E. L. Griffin, M. D., of Fond du Lac, Wisconsin, makes a specialty of supplying reliable bovine virus, at a moderate cost, and has appointed Geo. E. Ranney, M. D., of Lansing, his agent for this State, therefore all enquiries to the Secretary of the State Board of Health for reliable bovine virus may, with propriety, be referred to either of the above named gentlemen.

Respectfully,

A. HAZLEWOOD,

Chairman Com. on Epidemic, Endemic, and Contagious Diseases.

On motion, the report was adopted.

Rev. C. H. Brigham, Committee on Occupations and Recreations, read a paper on "Recreations and Health."

On motion, the paper was accepted with thanks and ordered published in the Annual Report. [See pages 27-46 of this volume.]

The Secretary, on behalf of Rev. J. S. Goodman, former committee on Finance, reported that after the last meeting Mr. Goodman had remained and examined the books of the office in connection with the Secretary's reports of property, etc., and had affixed his certificates to these documents.

The election of President for the ensuing two years was then proceeded to.

The Secretary on counting the ballots announced that Dr. H. O. Hitchcock had received four of the five ballots cast. Dr. Hitchcock thanked the Board for the honor thus conferred, but stated that having held the office since the organization of the Board, and feeling that there were other members equally deserving of the honor, he respectfully declined to accept the office for another term.

On motion, another ballot was taken, and Dr. R. C. Kedzie was declared elected.

Dr. Lyster stated that he had a paper upon "Baths and Bathing" in process of preparation, but was not ready to present it at this meeting.

Rev. C. H. Brigham stated that he had been gathering material for a paper upon "Sensational Literature," the subject referred to him at a previous meeting.

Dr. Baker reported the document on the "Restriction and Prevention of Scarlet Fever," which had been referred to Dr. Hazlewood and himself at a previous meeting. The document was read and discussed, and on motion the Secretary was directed to have 20,000 copies printed in the form of an eight-page pamphlet [see pages xxix-xxxii. of this volume], and to distribute the same to physicians, local boards of health, periodicals, etc., in this State.

The Secretary presented a circular to Correspondents relative to Scarlet Fever, upon which Dr. Hazlewood and himself had been working. The circular was discussed and finally adopted, and ordered printed and issued to regular Correspondents of the Board. [See pages 394-397 of this volume.]

The Secretary read a report by J. H. Beech, M. D., of Coldwater, relative to his investigation of the outbreak of diphtheria at Union City, Michigan.

On motion, the report was accepted with thanks, and ordered published in the Annual Report of the Board. [See pages 354-356 of this volume.]

Dr. Kedzie reported concerning the work he had done, in pursuance of the direction of the Board, in maintaining before the Legislature the present standard flash-test (140°) for illuminating oils. He had consulted with members of the committees on Public Health of the House and Senate, had delivered an address before the Legislature*; but feared that 130° F. would be the highest test that could be secured in the House.

Dr. Hitchcock thought that there should be no compromise on the part of the Board, that its position in demanding a safe test should be maintained.

Dr. Baker moved that the action of the Board as shown by resolutions adopted at former meetings, and the present views of the Board, be embodied in a memorial, and sent to the Legislature. The motion was carried, and the Secretary was directed to make and transmit such a memorial in the name of the Board. [See page lxxvi of this volume.]

The Secretary read a report of the principal items of work in the office since the last meeting.

On motion, certain replies to communications relative to Diphtheria were referred to the Secretary with authority to publish in the Annual Report. [See pages 356-381 of this volume.]

On motion, the Secretary was directed to insert, in the Report, replies of Correspondents relative to Prevailing Diseases, 1875,—received too late for publication in the last Report. [See pages 235-236 of this volume.]

A communication from John S. Caulkins, M. D., of Thornville, relative to a lamp explosion, was read and referred to Dr. Kedzie.

* [For this Address, see pages 69-80 of this volume.]

The Secretary read a communication from the Health Officer of the township of Forest relative to Scarlet Fever. On motion, it was ordered published in the Annual Report. [See pages 417–418 of this volume.]

The Secretary was authorized to arrange and publish in the Annual Report the communications received relative to Scarlet Fever. [See pages lxix–lxxii of this volume.]

A communication from Deputy Collector of Customs McDermott, of Bay City, detailing a successful application of the rules for “Treatment of the Drowned” was read, and it was suggested that these instances should be kept account of, as showing some results of the work accomplished by this Board.

Communications from W. G. Rhoads, of Philadelphia, relative to traps and the ventilation of sewer pipes; from F. W. Higgins, Superintendent of Woodmere Cemetery, Detroit, relative to taking meteorological observations; from the Health Officer of Paris, Huron Co., relative to the outbreak of small-pox, etc.; from C. H. Fountain, of Jackson, relative to lead pipes; and from H. C. Fairbank, of Flint, relative to typhoid fever from bad water, were read, and appropriate action was taken on each.

The subject of Vaccination and Vaccine Virus was discussed, and communications from E. L. Griffin, M. D., and Geo. E. Ranney, M. D., relative to the subject were read. On motion, the subject was laid on the table till the next meeting.

The Secretary read a list of names of persons proposed as regular correspondents of the Board. The persons named in the list were approved and the Secretary was authorized to ask them to serve.

Bills were then audited—vouchers 250–268, inclusive.

Dr. Baker offered a resolution requesting Dr. Kedzie to prepare an article, for publication in the Annual Report, upon “Water Examination,” the same to be prepared in such manner as to enable the general reader to grasp the general facts, and the professional reader to obtain such plain instructions as will enable him to make satisfactory examinations of water to be used for drinking purposes.

The resolution was adopted.

The Secretary was given authority to expend not to exceed twenty-five dollars in the purchase of books for the library of the Board.

The following resolution was unanimously adopted:

Resolved, That a hearty vote of thanks be given to Dr. Hitchcock—retiring President of this Board—for his earnest and able labors for the promotion of public health, particularly during the years in which he has been President of this Board.

On motion, the Board adjourned.

Regular Quarterly Meeting, July 10, 1877.

The Board met in the office of the Secretary of State, the following members being present:

R. C. Kedzie, M. D., President.

H. O. Hitchcock, M. D.

Hon. LeRoy Parker.

Rev. D. C. Jacokes.

Henry B. Baker, Secretary.

Dr. Hitchcock stated that his annual address as President, which should have been presented at the last meeting, was not yet ready, but would be presented at the October meeting. [See pages 1–19 of this volume.]

Dr. Kedzie, Committee on Poisons, etc., made a report concerning poisonous cheese, having received from Dr. Baker a specimen of cheese supposed to have caused sickness. The report was interesting and was followed by considerable discussion, at the close of which a motion was carried thanking Dr. Kedzie for the report, and asking him to continue his investigation and complete the report for publication in the Annual Report.

On motion, Dr. Kedzie was authorized to incur expenses necessary to enable him to visit cheese factories and investigate the methods of cheese manufacture.

Dr. Kedzie reported, concerning illuminating oils, that he had continued his labor with the Legislature, and was pleased to announce that a law for inspection had been passed embodying all the good points of the old law, and providing a standard test of 140° F., and also a test for paraffine.

Dr. Hitchcock reported back the subject of "Misplaced Bottles" referred to him at a previous meeting, and on motion it was referred to Dr. Kedzie. [See pages 21-26 of this volume.]

On motion, the paper of Dr. Kedzie on "Illuminating Oils in Michigan," was ordered published in the Annual Report. [See pages 69-80 of this volume.]

The regular committees of the Board were then taken up in order and reorganized. [See page viii. of this volume.]

A new committee, namely, on Mental Hygiene, was established, and Dr. Hitchcock was made that committee.

On motion, a new by-law was adopted, as follows: "All papers for the Annual Report must be in the hands of the Secretary on or before the day of the October meeting in each year."

Dr. Kedzie reported that he had made some progress in the preparation of the paper on "Water Examination."

The Secretary presented a schedule of property which certain vouchers showed had been purchased, but which did not appear on the "Property Book" of the office. On motion, the Secretary was directed to enter each such item in the "Property Book," and to write opposite each article the disposition of it ordered by the Board.

The Secretary read his quarterly report of the principal items of work in the office since the last meeting.

Dr. Lyster, though not present, had sent in a report of his attendance at the meeting of the American Medical Association at Chicago, June 5-9, 1877, which was read.

He stated that the Association was divided into five sections, viz.: I. Practice; II. Obstetrics; III. Surgery; IV. Medical Jurisprudence; V. State Medicine and Public Health. Dr. Lyster attended and reported the last-named section, in which three papers were read; viz.:

1. "The Etiology of Enteric Fever," by Dr. J. L. Cabell, of Va.
2. "Tuberculosis of Milch Cows, and the Contagiousness of Tuberculosis by the Digestive Organs," by Dr. A. N. Bell, of N. Y.
3. "The Laws of Heredity, with special Reference to the Transmission of Morbid Tendencies, Abnormal Forms, and the Effects of Intermarriages."
4. "The Results of State Legislation on Public Health," by Elisha Harris, M. D., of N. Y.

Dr. Cabell's paper on the Etiology of Enteric Fever was founded upon the observations of himself and others in the State of Virginia. He enumerated some

of the causes of Enteric Fever, as follows: 1. Decomposition of excrements; 2. Milk with foul water from a poisoned well; 3. Vegetable Decomposition. The disintegration of Vegetable Decomposition, and decay of dry timber,—the latter supposed to be the most powerful; 4. Soil saturation, with organic impurities; low level of ground water during fevers; 6. Undefined Telluric influences. A clear distinction was shown between enteric and typho-malarial fevers, the latter having a similarity to remittent fever.

Dr. Black, in his paper on Heredity, asserted that the race, if not retrograding, was not advancing. Money was used to instruct idiots and cure insane persons, but none was used to prevent these conditions. A small per cent of the offspring of deaf-mutes were deaf-mutes, but pulmonary consumption was decidedly increased by intermarriage of persons of a consumptive family.

Dr. Bell was of the opinion that tubercular disease could be derived from the milk of cows affected with tuberculosis, and that the milk of such cows was often the cause of death in children. Experiments have proved that tubercular matter can be imparted from one animal to another by means of the digestive system, and this was not prevented by boiling for 15 to 30 minutes. He intimates that stall-fed cows are more liable to tubercular disease than are animals not so kept.

Dr. Harris, in his paper upon the result of State Legislation upon Public Health, alluded to the results of well-considered laws in the prevention of disease. Communicable diseases had been quarantined, and dangerous nuisances abated. Boards of Health had been established in many States. A sanitary survey of the State of New York had been begun. The desirability of such a survey in Michigan had been suggested, and Dr. Lyster hoped that it might soon be realized. The meeting of the section was evidently a success, and the interest in its work increasing.

On motion, Dr. Lyster's report was accepted with thanks.

On motion, the Secretary was authorized to buy the *Encyclopædia Britannica* (9th edition, cloth binding), for the library of the Board.

The Secretary was authorized to ask certain physicians named, to act as regular correspondents of the Board.

A communication from H. F. Lyster, M. D., relative to small-pox in Detroit, was read, and, on motion, accepted with thanks, and ordered published in the Annual Report. [See pages 105-109 of this volume.]

On motion, the report of the State Inspector of Illuminating Oils, presented at a previous meeting, was referred back to the author for completion up to August 1, 1877, preparatory to publication in the Annual Report. [See pages 85-90 of this volume].

On motion, the Committee on Legislation was requested to consider the propriety of planning uniform legal provisions for boards of health of cities and villages.

On motion, it was voted that the weekly reports of diseases in Michigan be compiled and published in the Annual Report. [See pages 237-343 of this volume.]

The Secretary was directed to have replies of Correspondents relative to prevailing diseases, 1876, published in the Annual Report. [See pages 167-236 of this volume.]

The Secretary was authorized to have replies of Correspondents relative to scarlet fever, published in the Annual Report [see pages 391-447 of this vol-

ume], also replies of Correspondents relative to water-supply. [See pages 143-166 of this volume.]

On motion, another edition (6,000 copies) of documents on "Treatment of the Drowned" was ordered printed.

A communication from Dr. J. S. Caulkins of Thornville, relative to an outbreak of diphtheria at Rochester, was read, and on motion it was voted that he be requested to further investigate the subject and report to the Board.

On motion, it was voted that Dr. Arthur Hazlewood be respectfully requested to prepare an article on "The Diet of Infants," for publication in the Annual Report of the Board. [See pages 99-104 of this volume.]

Bills were audited—vouchers 269-288 inclusive.

Dr. Hitchcock offered the following resolutions, which were unanimously adopted:

Resolved, That it is with sincere regret that we have heard of the severe illness of our associate on this Board—Rev. Charles H. Brigham;

Resolved, That we extend to him our sympathy, with the hope that he may be speedily restored to his usual health and his great usefulness.

The following were also unanimously adopted:

Resolved, That it is with deep regret that we have heard of the death, after a long illness, of Dr. Zenas E. Bliss, of Grand Rapids, and late an efficient member of this Board;

Resolved, That the sincere sympathy of this Board be extended to his afflicted family, in this their hour of sorrow;

Resolved, That the Secretary be directed to transmit a copy of the foregoing resolutions to the widow of the late Dr. Bliss.

On motion, Hon. LeRoy Parker was requested to attend the meeting of the American Social Science Association at Saratoga, Sept. 4-7, 1877, in the interests of public health in Michigan.

On motion, Dr. H. O. Hitchcock was asked to attend the meeting of the Association for the Cure of Inebriates, to be held at Chicago September, 1877.

The subject of vaccine virus, laid on the table at the last meeting was meeting, was taken up, and the following resolution passed:

Resolved, That on behalf of this Board the Secretary be instructed to return thanks to Dr. George E. Ranney for his trouble in securing and rendering accessible to physicians and others in this State, reliable, non-humanized cow-pox virus; and to request him to assume a permanent agency for the distribution of virus propagated by Dr. Griffin, or by some other equally reliable person.

On motion, the Board adjourned.

SPECIAL REPORTS AND COMMUNICATIONS TO THIS BOARD.

During the year, communications have been received from health officers, from regular correspondents, and from others, containing valuable statements of facts and important considerations, bearing upon different subjects connected with public health. Some of them have been referred to the different committees of the Board, and appear in other parts of this volume; some have been referred to the Secretary, with authority to publish; while time has not been found, during the limited sessions of the Board, to present, at length, all communications of this class that have been received. A report of the work of the Board would not be complete without

some mention of these communications, and a few of those not otherwise disposed of are believed to be of such value as to make it desirable that they be included herewith. They have generally been received because of an official request for further information concerning unusual sickness reported to this Board. Those selected for publication are the following:

CASES OF TYPHOID FEVER CAUSED BY IMPURE DRINKING WATER, REPORTED BY H. C. FAIRBANK, M. D., OF FLINT, MICHIGAN.

Secretary State Board of Health:

DEAR SIR:—The following experience comes up fresh to my mind, confirming a belief that *Typhoid Fever* often originates in the poison of our *drinking water*.

In the Autumn of 18—, I was requested to see a young lady aged 20 years, residing in an adjoining county, who had been sick two weeks. On my arrival, I found her very low, with the usual concomitants of Typhoid Fever in a frail and delicate female,—*subsultus tendinum* and delirium being among the more prominent symptoms. Within a few days her father, who had watched her carefully during her sickness, was stricken down with the same disease. Within ten days of this time, the oldest son, 14 years of age, was attacked; and soon after, the second son, about 10 years old, fell a victim to what I began to regard as a household scourge,—and I set myself to work to see if I could discover the cause of the disease.

The family lived on a high gravelly sand-hill; they were cleanly in every respect, so far as I had been able to discover; and, though I searched from cellar to garret of their dwelling, I was at a loss to understand why so many of the family should, within so short a time, fall a prey to the disease. Delirium and great prostration were early perceived in the progress of the complaint, and small abscesses and bed-sores were among the effects demanding my attention. About this time I went to the spring from which the family had during the Summer (their well having failed) obtained their drinking water. I discovered that it was situated about 60 feet below the *privy*, and that the soil about and connecting both, was porous, and admitted of leakage from the *privy* to the spring. I should remark that the taste of the spring-water was a little peculiar, and that I had refused to drink it some time before seeing the location of the spring. I did not seek further for the source of the disease.

The father died; the three children recovered, but not till after many weeks of suffering. I pointed out to the family what I believed to be the cause of their illness, and urged the importance of seeking elsewhere their water for drinking and culinary purposes. I believe they have, for the most part, been healthy since that, to them, memorable Fall.

These cases furnish additional proof of the importance of vigilance on the part of the medical men at least, in order that this quite too common source of disease be remedied wherever possible.

Flint, Mich.

Very truly,

H. C. FAIRBANK, M. D.

CASES OF SICKNESS DUE TO EMANATIONS FROM DECOMPOSING ORGANIC MATTER, REPORTED BY MRS. M. W. HOWARD, LANSING, MICHIGAN.

Secretary State Board of Health:

DEAR SIR:—Some years ago a family lived on an avenue just south of the garden belonging to the Norfolk County (Mass.) jail. In the center of the garden was a mound where the excreta from the jail was every morning deposited, and earth thrown over it, but not enough to prevent it from exhaling noxious odors. The jail sheltered from two hundred to three hundred inmates. One night in August, when the wind was right to bring the air from the north into the open windows, four of the family were seized, nearly simultaneously, with severe vomiting and diarrhœa, which lasted several days. The circumstances were such as to leave no doubt as to the cause.

A friend at my elbow says she distinctly remembers her father's family being affected in a similar manner by having old potatoes removed from the cellar in hot weather. As long as they were undisturbed the odor did not affect them, if in reality any was perceived.

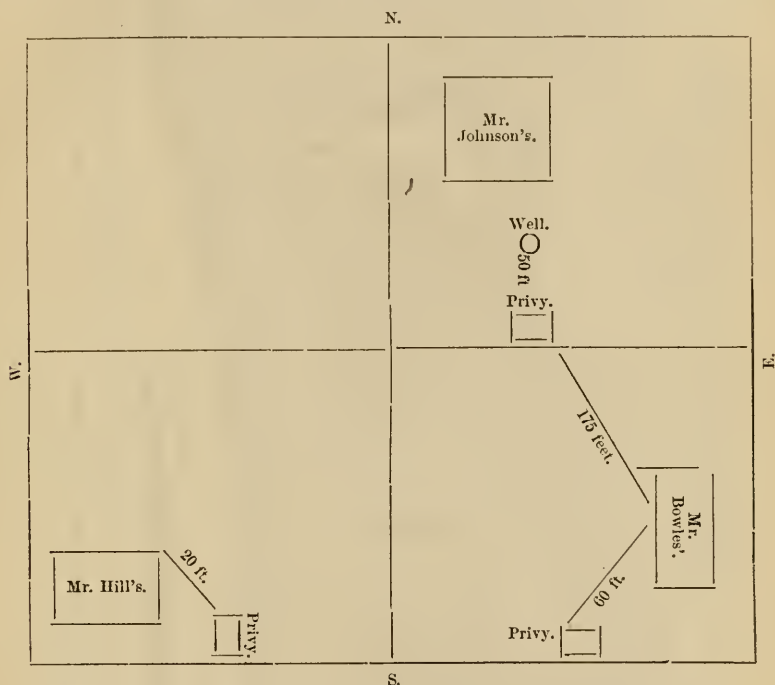
Lansing, Mich.

M. W. HOWARD.

CASES OF TYPHOID FEVER NEAR FOUL PRIVIES, ONE CASE NEAR CARRION FUNGUS,
REPORTED BY L. D. KNOWLES, M. D., CLERK OF PINE GROVE TOWNSHIP, VAN BUREN
COUNTY.

Secretary State Board of Health :

DEAR SIR:—Below is a diagram showing the positions of the different houses in
which occurred the three cases of typhoid fever named in my report :



The first case was John Bowles, aged 24, a teamster. His occupation necessitated his being up early in the morning, and out late in the evening; in passing from his home to the barn, he was in the habit of passing through the lot of Mr. Johnson, the opening in the fence being on the east side of Mr. Johnson's privy, which was in a very bad condition, the odor arising from it being very foul. Mr. Bowles passed this place on an average six times a day, and at a time in the day when the stench was most concentrated. This I believe to have been the cause of his attack. The water the Bowles family used I believe to have been good.

The Hill family live in a low, rambling house, without any underpinning, and in an uncleanly manner; or, in short, they are filthy. Their privy is but twenty feet from their living-room, and was full to overflowing. There was no intercourse between Mr. Bowles' and Mr. Hill's families. I believe the nearness of their privy, and the filthy condition of their abode to have been the cause of their sickness. The water here, too, was good.

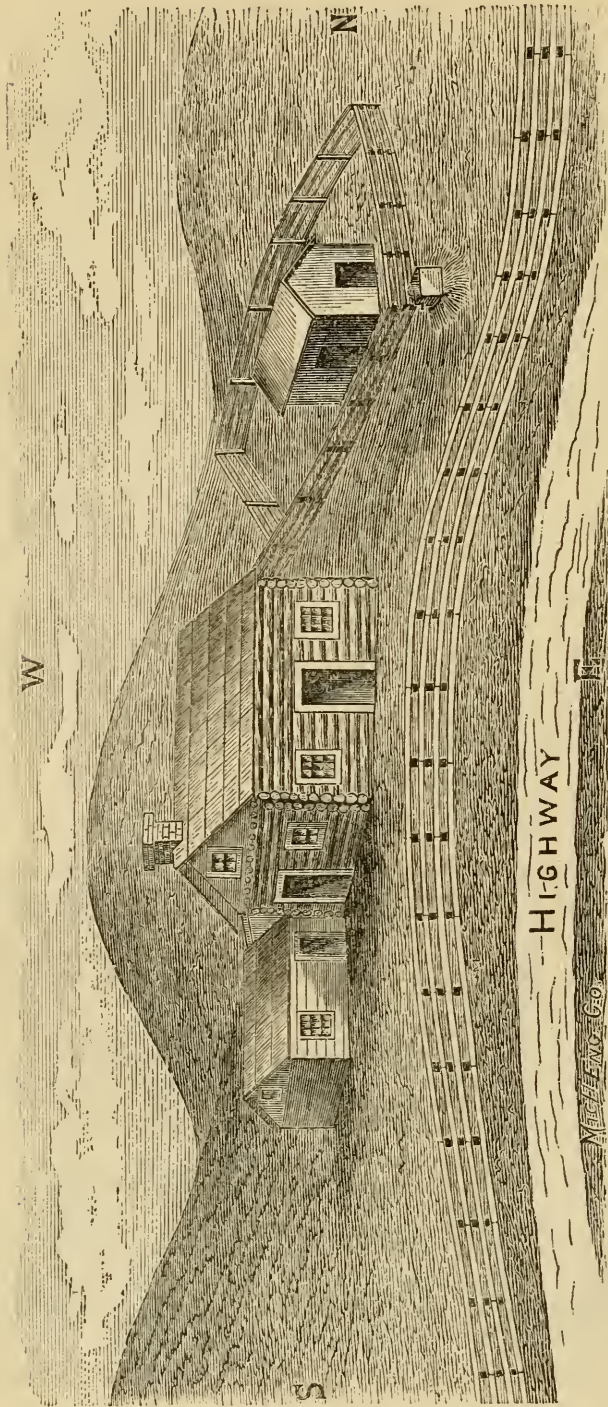
As to the diagnosis, I can say they were all typical cases. Mr. Bowles and Nettie Hill, in connection with other symptoms, had hemorrhage from the bowels.

I observed at Mr. Hill's a peculiar stench which remained after the privy had been removed, and the house thoroughly cleansed. I directed my attention particularly to finding the cause of this stench, but was unsuccessful at first; finally upon taking up an old board walk in front of the house, Mr. Hill found what is known in this locality as *Carrion plant*. After its removal, all trouble ceased. I do not know as this is of any account; but as the growth of so odorous a plant was a surprise to me, I will report the same, and it may pass for what it is worth.

Yours truly,

Kendall, Van Buren Co., February 5, 1877.

L. D. KNOWLES,



House in Bridgewater Township, Washenaw County, in which all the members (10) of one family had Typhoid Fever, 3 of them dying of the disease; in which all the members of the family who lived in it next before were sick, and in which one of them died; and in which one member of the family who first lived in it died. See opposite page.

OUTBREAK OF TYPHOID FEVER IN BRIDGEWATER TOWNSHIP, WASHTENAW COUNTY,
REPORTED BY D. W. PALMER, CLERK.

Secretary State Board of Health:

DEAR SIR:—The residence of the Rentschler family, pictured on the opposite page, is on Section 8, Town 4 S., Range 4 E. It is 4 miles north of Clinton, and 5 miles east of Manchester. The upper stratum of soil consists of two and one-half feet of light sand; below this, for many feet, is coarse gravel. The well is 21 feet deep, and is stoned with round, or irregular stones. I think there is no clay subsoil from the surface to the bottom of the well. The distance from the north-east corner of the house to the well is 4 rods and 16 links; from the front door of the house to the fence in front is 2 rods and 13 links. The old shanty, or barn,* is nearly on a level with the well; but by the digging of the well the surface of the earth about it was raised somewhat. The water in the well was said to be quite clear. The distance from the house to the top of the hill on the west is 8 rods; the distance to the top of the hill on the south, south-west, and south-east is 6 rods. The angle of elevation of the hill is about 45°. There is a gradual descent from the road to the front door, and the floor is lower than the surface of the ground, except at the north-east corner of the house; then there is a descent to the well and barn-yard. Under the floor there is an excavation 3 feet deep by 10 feet square, probably. At the north-west corner of the dwelling is an old cistern without covering, and, I am told, there was water standing there most of the time. I think the small building in the barn-yard was used as a privy.

The Rentschler family consisted of 10 members. The first case was a boy 12 years old, who was taken sick June 6, 1876, and recovered in November of that year. In the meantime all the other members of the family had been sick, and three of them,—the mother, aged 45, a girl aged 18, and a girl aged 12,—had died. From July 31 to Aug. 30 there were from 4 to 7 of the family sick. Two persons who attended as nurses had typhoid fever, and one other was sick awhile and died. The family who resided there previously were all sick, and one of them died; the family who went into the house when it was new lost one member. The Rentschler family were Germans, of good constitutions, and were comparatively neat and cleanly in their surroundings.

River Raisin, May 17, 1877.

D. W. PALMER,
Clerk of Bridgewater Township, Washtenaw Co.

CASES OF TYPHOID FEVER IN CHESTER AND ROXAND TOWNSHIPS, EATON CO., RE-
PORTED BY J. L. JOHNSTON, M. D., HEALTH OFFICER OF CHESTER TOWNSHIP.

Secretary State Board of Health:

DEAR SIR:—Mr. E. B., aged 54, and his sons and daughter (Mrs. A., of Roxand) were all taken sick, October 13 to Nov. 17, 1876, with Typhoid Fever. The father and eldest son died. T. M. A., M. D., son-in-law of Mr. B., informed us that he considered that the cause of the disease was contamination of the well-water with dead animals. He stated that they had taken out dead and decomposed frogs and toads, and he thought that if they had gone deeper they might have found cats. They do not use the water now. He stated that the water was *very foul*, and that he had warned them, two weeks before any of them were taken sick, that if they did not quit using the water it would kill all of them. There is an iron pump in the well. The distance of the well from the house is 12 feet; from the cellar, 20 feet; from the privy, about 40 feet. The well is 24 feet deep. The soil is sandy for 10 feet deep, then blue clay. There is no effect from surface water. The well fails in very dry weather. When the well was dug, years ago, there was a vein, or seap about 12 or 15 feet deep that came into the well from the direction of the cellar. The condition of the cellar, we were informed by an old gentleman who was in it last Spring, was very bad. He stated that the water and mud was over shoe-mouth deep, that they had to use boards to walk on, and that there were decayed potatoes and apples and other vegetables in it. There is no drain to the cellar. Now, might not this foul water, as it soaked away through the sandy soil, have passed through that vein that came into the well when they were digging it, from the direction of the cellar, and then when the water got low, in the dry months of the Summer, have been one of the causes of the disease?

Your obedient servant,

Chester, Eaton Co., February 3, 1877.

J. L. JOHNSTON.

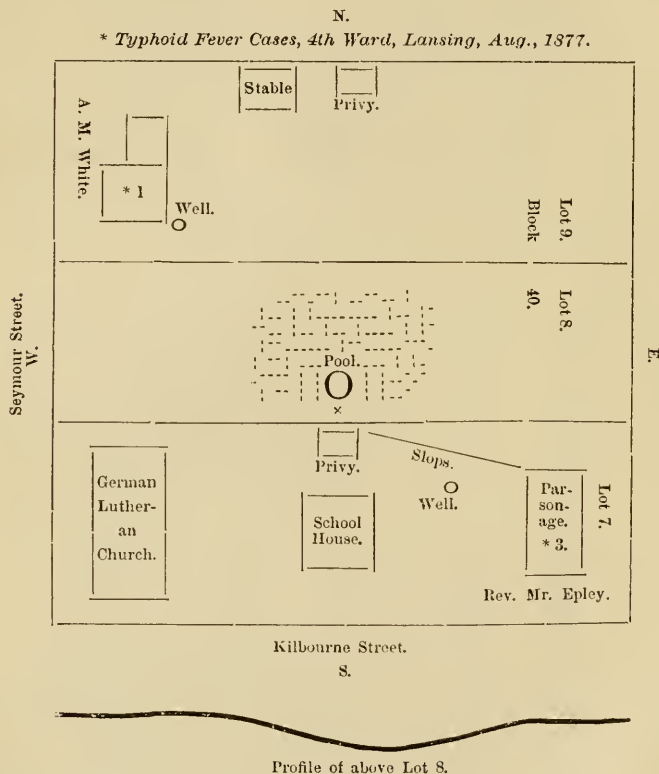
April 5, 1877, Dr. Johnston wrote that Mrs. B. also had died of the Typhoid Fever.

*[A. W. Alvord, M. D., of Clinton, Mich., states that the distance of the well from this "cow-pen and pig-sty," as he calls it, is, by actual measurement, 13 feet. See "Replies Relative to Water-Supply," pp. 150-151. Under date of May 21, 1877, he says: "They were cases of *true typhoid* or enteric fever."—H. B. B., Sec'y.]

CASES OF TYPHOID FEVER FROM OVERFLOWING PRIVY-VAULT, REPORTED BY O. MARSHALL, M. D., NORTH LANSING, MICH.

Secretary State Board of Health :

DEAR SIR:—The following is an explanation of the enclosed drawing. Jay White, son of A. M. White, aged 13, was taken sick with typhoid fever August 8, 1877. Soon after, three of the family of Rev. Mr. Epley, who resides in the parsonage, as shown in the drawing, were taken sick with the fever.



An examination of the premises showed that the vault of the privy, which was the only one in use for the church, the school house, and the parsonage, was overflowing into the adjoining lot, where a pool had formed from the contents of the vault and the slops from the parsonage. The matter was very offensive, and tainted the air for a considerable distance around. As soon as discovered by the City Board of Health, the nuisance was abated. As a probable cause of these cases of typhoid fever, it is given for what it is worth. No other cases occurred in the neighborhood.

Yours Respectfully,

O. MARSHALL.

Lansing, September, 1877.

CASES OF TYPHOID FEVER AND OTHER DISEASES, REPORTED BY HEALTH OFFICERS AND OTHERS.

In a report received December 2, 1877, D. E. Newcomb, M. D., Health Officer of Ash township, Monroe county, reported eight cases of typhoid fever, three of which were fatal, and one non-fatal case of diphtheria, occurring in said township from February 22 to October 13, 1877.

December 10, 1877, Myron C. Scully, M. D., Health Officer of Vernon township, Shiawassee county, reported one case of typhoid fever, taken sick in September and died October 25, 1877, and one non-fatal case of scarlet fever, taken sick July 15, 1877. The scarlet fever was thought to have been derived from township of Venice, adjoining Vernon on the north, where there had been several cases during the Spring and Summer.

November 4, 1877, James Winters, Health Officer of LeRoy township, Calhoun county, reported twenty-two cases of whooping-cough, one of which was fatal, in said township, taken sick from July 1 to 19, 1877.

A report received October 3, 1877, states details of eleven cases of measles, with no deaths, in township of Noble, Branch county, taken sick from April 5 to July 7, 1877.

December 31, 1877, the Board of Health of Pine Plains township, Allegan county, reported twenty-three cases of measles taken sick in said township, from April 15 to August 1, 1877, the first case of which was contracted at Three Rivers, Mich., April 1, 1877. All recovered.

EPIDEMIC OF SCARLET FEVER, REPORTED BY F. J. DOWNER, M. D., OF GREENLAND, ONTONAGON CO., MICH.

Secretary State Board of Health:

DEAR SIR:—Your favor of Feb. 13 has been at hand for some time.

I have attended, to date, eighty-three cases of scarlet fever, with three deaths. As to the origin of the epidemic: In December, 1875, I attended three cases, confined to one family, in this township. There had been no case of scarlet fever in this county since 1870, when there were a few cases in this neighborhood. The family of whom I speak had visited relatives at Ontonagon, distance 12 miles, who had recently moved there from Duluth, where there was an epidemic of the fever at the time of their departure. None of the relatives visited had the disease, nor had any of the family visited those who had it. A few days after their return home, their baby, between six and seven months old, was attacked with the fever. Three days after the baby was taken sick, its brother, aged six years, was attacked; and seven days thereafter, their mother, aged 25 years, was attacked. All communication with the family was stopped, and the disease spread no farther at the time. None of the friends of the people visited have had the fever, except those mentioned. The boy, aged 6 years, was very dangerously ill for over nine weeks, and it was much longer than that before he was able to leave his room. He has had, from time to time since, a slight discharge from one of his ears. There were no more cases in this vicinity or county until Oct. 23, 1876, when a child aged 5 years, a near neighbor of the family spoken of, was taken with the disease. The family to whom the child belongs are of the poorer class of miners, and had had no communication whatever outside of the immediate neighborhood. The boy first spoken of has played habitually through the Summer with the last-mentioned one, and I know of no other way in which the latter could have contracted the disease. In this connection, I wish to mention one incident which has been of interest to me. The family who had the disease in Dec., 1875, have a neighboring family living not more than twenty yards distant, in which there is a boy about the same age as the one mentioned as having been sick so long. They were together much of the time before the sick boy was able to leave his room. He has been many times since directly exposed, but has resisted the disease until within the past week, when he was attacked with a mild form; but I cannot trace any exposure direct or indirect for over two months.

In answer to your second question, I wish to say that the sanitary condition of the people in this section, with comparatively few exceptions, is unfavorable in the extreme, especially in the Winter season. As you are probably aware, the almost exclusive business of this county is mining; and the miners and laborers—mostly Irish, English (Cornish), and German—are, as a class, ignorant, superstitious, and filthy. In justice to the Germans, I must say they are vastly superior in every particular to the other nationalities. As a rule, the houses are so arranged in Winter that but little pure air can find entrance. Generally the front doors are nailed up, and double windows nailed over the usual windows on the outside. The only communication with the outside is through the back door, and in very many instances one is obliged to pass through the cow-stable, or hen-roost (the kitchen in Summer), before making his exit. In most instances, it has been absolutely impossible to have the patients bathed, or their clothes changed, on account of the fear of taking cold; and to open a window for the purpose of letting in pure air, was simply killing their child, in the estimation of parents and friends. To have the air changed in a room, it is almost always necessary for me to see it done, which, with the amount of

work I have had to do, has been impossible for me to attend to properly; and whenever I have smashed out a pane of glass for that purpose, the hole has generally been filled with an old blanket, by the time I was fairly out of sight. The conglomeration of smells in such a room (the houses have generally but two rooms, with a shanty at the back, not used by the human part of the family in Winter), can possibly be imagined, but the language does not contain the requisite words to describe it. In a minority of my cases I have not had these unsanitary conditions to contend with, but have been able to give my patients a daily bath, not a cold bath—I don't believe in them—but a thorough sponging with tepid water over the whole body, an entire change of air in the sick-room at least twice in twenty-four hours, and clean clothing and bedding every day; and I must say—although I very much dislike to admit it—that my cases under these circumstances have done *no better* than those in the most filthy houses. I have had cases of severe anginose scarlatina in houses where the surrounding sanitary conditions were good, and others where the filth was excessive. I have seen the former die, and the latter, while apparently no better able to withstand the encroachments of disease, and seemingly just as sick, would recover, with filth a half-inch thick on the floor, and in air one would think would kill a well person. Please do me the credit to think I am not arguing in favor of filth, but only stating facts as I have seen them.

Of the three cases I have lost, the first was a healthy, strong girl aged 19 months, with a Scotch mother; she had anginose variety. The house was small, with only a living-room and bedroom; but the family are clean and neat. The child was well nursed, kept clean, and constantly attended; the air in the room was changed often. She died on the seventh day, with symptoms of extreme blood poisoning. The second, Wm. J. Cornish, aged 3½ years, was poorly nourished; same as above; surroundings not quite so good, but still not poor. He was kept clean, and the air was changed often. He died on the thirteenth day, from exhaustion. Wm. H., Irish, aged 3 years, strong, was well nourished. The disease was of the anginose variety. House was large, and kept moderately clean, but was poorly ventilated. The clothes of the patient were changed but once. He was well attended. He died on the fourth day, from deficient aëration of blood.

In the first case, the brother, aged 7, and two sisters, 10 and 3 years old, all had the disease moderately severe, and recovered with no particular trouble. In the second case, the two brothers of the patient, aged 7 and 10 years, had no symptoms of the disease, although constantly in the room. In the last case, the whole family of seven children had the fever, all mildly except the one who died. I have had many other cases of about the same age, seemingly with as severe a form, and with the very poorest hygienic surroundings, who have recovered under the same medicinal treatment under which these died; hence my statement that I cannot see that unfavorable surroundings have aggravated the disease in any particular. Perhaps a remark made by a physician formerly holding the same situation I now occupy, will better illustrate the extreme filth in some of the houses in this vicinity. When asked by a woman if it would harm her children to play outdoors in the dirt, he answered her: "No, it won't hurt them; and if there isn't enough dirt out there, carry some out!"

I consider that the disease was spread in this township by schools almost entirely, and in the majority of cases cannot trace the spread of the fever to direct exposure, except in this way,—that families having one or more children sick would, in many cases, persist in sending the well ones to school until they too evinced some symptoms of the fever; but in very many cases there was no direct exposure possible. I have had no cases which I believe would be of special interest. I have noticed a trace of albumen in the urine of a majority of the cases, during the course of the fever, and in three cases have had albuminuria with tube casts, following the fever in from ten days to three weeks, all of which have improved markedly under the usual treatment. These three cases all followed light attacks of the fever. I have had, I think, about the usual proportion of otorrhœa, conjunctivitis, glandular affections, etc.

Very respectfully yours,

Greenland, Ontonagon Co., Mich., March 4, 1877.

F. J. DOWNER,

CASES OF SCARLET FEVER REPORTED BY JOHN BELL, M. D., OF BENTON HARBOR, MICH.

Secretary State Board of Health:

DEAR SIR:—In the month of March, two cases of scarlet fever, aged 3 and 5 years, came under treatment in one family of poor persons, living as poor people generally do. A short distance from this family the disease of a mild form occurred in another house, and I believe no physician was employed.

Those were the only cases of the disease in town or vicinity, that I knew of during the present year up to June 12.

(*Case 1.*) A boy 8 years old was attacked with all the symptoms of scarlatina, on June 12. When I named it scarlet fever, the mother stated he had what I called scarlet fever 5 years previous (at that time the disease was prevailing in the village); nevertheless, I had no reason to change my diagnoses.

(*Case 2.*) A boy aged 5 years was attacked July 1. He lived on the same street, only a short distance from case 1. There was no known chance for the operation of contagion between those two cases.

(*Case 3.*) July 7 another case occurred in town, quite remote from the first two cases. It was a child aged 5 years. In this case also, the parents stated that he had the disease three years previous.

(*Case 4.*) This occurred in the same family as case 1, on July 9, about 4 weeks after the first case. This was a child 6 years of age.

(*Case 5.*) This was a child aged 17 months, also in same family as cases 1 and 4. It was taken on July 15.

In all of those cases, the families were in good circumstances, and there was nothing in the surroundings to account for the outbreak of the disease.

There has not been another case of the disease in town since that time.

(*Case 6.*) Six miles from town, on Sept. 17, three children, aged respectively 11, 14, and 17, were attacked with scarlatina. All three commenced complaining the same day; the disease ran a tolerably severe course. There was no known cause of contagion or infection, there not being any other cases of the disease in that section of country, and none of the family having been away from home; in fact there does not appear to be the slightest chance for contagion.

(*Cases 7 and 8.*) Sept. 22, in the same family, a child aged 9 years, and Sept. 26, another child aged 15 were attacked.

During the first day's illness of case 1, several of his playmates were with him during a great portion of the day, none of whom caught the disease.* Two children of another family lived in the same house with case 2, neither of whom were affected. In all the other cases there were chances for the operation of contagion; but it has failed in its operation.

About two-thirds of those attacked suffered from the anginose variety; the remainder of the cases were simple. All cases recovered; two were followed by sequela; one, by inflammation of glands of the neck, no suppuration; the other, by slight attack of dropsy.

Benton Harbor, Berrien Co., Oct. 5, 1877.

J. BELL, M. D.

CASES OF SCARLET FEVER AND OTHER DISEASES, REPORTED BY HEALTH OFFICERS AND OTHERS.

Tyler Hull, M. D., Health Officer of Windsor township, Eaton Co., Mich., reported details of 26 cases of scarlet fever (12 male and 14 female) which occurred during March, April, and May, 1877, one of which had died and four of which were still sick when the report was made (report not dated, but received June 25, 1877). He said: "I was called to treat all but 5 of them. Most of them were mild but well-marked cases. All that I treated could be directly referred to contagion; and 3 of the 5, also, which I did not treat can positively be referred to contagion."

September 29, 1877, H. S. Robinson, clerk of Berrien township, Berrien county, reported seven non-fatal cases of scarlet fever occurring in said township from August to September 26, 1877, source unknown.

May 1, 1877, Noah LeBlanc, Clerk of Ecorse township, Wayne Co., Mich., reported 5 cases of small-pox in one family; also, in the township, 3 cases of scarlet fever and 5 of whooping cough.

October 1, 1877, Thomas Myron, clerk of Grant township, St. Clair county, reported one death from cerebro-spinal meningitis in October, 1876; three cases of scarlet fever occurring subsequently to August 1, 1877; and a greater number of cases of cholera infantum and diphtheria occurring within the year ending September 30, 1877, the last case of diphtheria occurring in September. The scarlet fever was derived from the city of Port Huron.

The Circular, 17, of Inquiry with regard to Scarlet Fever, five correspondents excused themselves from answering, on the ground that for several years there had been but few or no cases of the disease in their localities. Because of the importance of authentic statements of the absence from a locality for any considerable time or at

*[But they may have disseminated it.—H. B. B., Sec'y.]

any given time, of a leading disease, and as a matter of justice to these correspondents themselves, extracts from their letters are given, as follows:

N. D. Yale, M. D., of Deerfield, Lenawee Co., Mich., wrote, Jan. 20, 1877: "I have never treated cases of scarlet fever through an epidemic. I have had several sporadic cases, one very severe one recently. But Deerfield has had no epidemic of the disease since 1870."

C. M. Woodward, M. D., of Tecumseh, Lenawee Co., Mich., wrote, May 7, 1877: "No cases of scarlet fever have come under my observation in this village in the last two years; and so far as I can learn, no cases have occurred in this village or vicinity in that time."

C. Russell, M. D., of Hastings, Barry Co., Mich., wrote, May 14, 1877: "I do not think that there has been a single case of scarlet fever here in four years."

E. A. Chapman, M. D., of Walled Lake, Oakland Co., Mich., wrote, May 16, 1877: "There has been no scarlet fever in this vicinity since I began practice."

Robert Stephenson, M. D., of Adrian, Lenawee Co., Mich., wrote, Sept. 27, 1877: "I have kept no record of cases; and as there have been so few cases during the last year, I have deemed it better not to answer the circular."

May 9, 1877, Charles W. Niles, M. D., of Calumet, Houghton Co., Mich., wrote, in reply to the Circular: "We have had four cases of scarlet fever this Winter, only one requiring any special medical treatment. This case was very mild. At the Allouez mine, 4 miles north, and at the Franklin mine, and at Hancock and Houghton, 10 miles south, scarlet fever was very prevalent."

March 12, 1877, H. S. Taft, M. D., of Marquette, Marquette Co., Mich., wrote: "I know of nothing more remarkable in the public health here than the exceedingly mild form of scarlet fever."

July 17, 1877, John P. Wilson, M. D., of Pontiac, Oakland Co., Mich., wrote: "The disease has prevailed in the surrounding country more or less all Winter, but has shown itself in this city only within the last 3 or 4 weeks; and there are not 6 cases altogether, as yet."

Cases of Scarlet Fever were reported by A. Nash, M. D., of Lapeer, Lapeer Co., Mich., in connection with his replies to the Letter of Inquiry concerning Diphtheria. Details are given in that reply, on pages 364-365 of this volume.

DISINFECTION AND RESTRICTION, SCARLET FEVER.

With regard to the purification of material infected with Scarlet Fever contagium, the following fact is deemed of sufficient importance to be worthy of mention in this connection:

A successful case of disinfection of Scarlet Fever contagium is given in The Practitioner, London, May, 1877, page 345. *Sulphur* was used, being burnt in iron braziers, and upwards of 4,000 blankets, mattresses, etc., were thoroughly purified in 4 hours.

J. R. Black, M. D., of Newark, Ohio, in a letter to the Secretary of this Board, dated July 12, 1877, made the following suggestion: "In efforts for the limitation of scarlet fever, the head should never be neglected. If it is, every time the little one scratches his head among his fellows, a little cloud of infecting dust will be diffused in the immediate vicinity; besides, the infecting scales *stick* amid the hair longer than on any other part of the body."

TRICHINIASIS IN OTSEGO TOWNSHIP, ALLEGAN CO., REPORTED BY DAVID MITCHELL, M. D., OF OTSEGO, MICH.

Secretary State Board of Health:

DEAR SIR:—I was called, February 2, 1877, to see a family living in the township of Otsego, Allegan county, consisting of husband, wife, two daughters, one son, and a hired man; all excepting the husband were affected with symptoms very similar, and which were as follows:

There was a puffy swelling around and under the eyes; the limbs were slightly swollen; there was great inability to move, due to a stiff, painful feeling of the muscles; a general feeling of lassitude; loss of appetite; diarrhoea to some extent; moist skin; great sleeplessness; slightly accelerated pulse; tongue slightly furred; urine, normal in quantity but high colored; nausea in most of the cases, and in some, vomiting; temperature a little above normal; in the mother and older girl, a slight vesicular eruption manifested itself for a few days. The œdema of the face lasted for more than a week, and then the legs began to swell. Their ages were: mother, 39 years; girls, 19 and 13 years; boy, 16; and hired man, 25. Their surroundings were good; locality, healthy. All had been well until they were suddenly attacked with the above symptoms.

I made the above diagnosis and found that their having eaten raw ham seemed to verify my opinion; although it was three weeks afterwards when, by aid of microscope, trichinae were found in the ham by Dr. Chas. Gaylord and others. The hams were from a two-year-old sow, raised by the man, which had been healthy until he began to fatten her, when she sickened and failed in flesh a good deal. She then improved again, and was butchered; and the meat was used by the family, part of it by his brother's family, who were more slightly affected and recovered without medical treatment.

All made good recoveries, but feel to some extent a weakness of the voluntary muscles, which are easily sprained, or rather the fibres of which are easily ruptured; as some of the patients say that after trying to lift heavily they feel severe and sudden pain in the muscles, which lasts for some time. This condition of things continues to some extent yet. The hair of most of the patients has fallen out. They were under treatment, or rather were looked after for something to treat for, from three to five or six weeks. The mother and youngest girl were the worst, and were the ones who ate the most raw ham. A symptom I neglected to speak of was a feeling of suffocation, at times, which lasted for about ten days, then gradually became less, and finally disappeared.

Otsego, Mich., July 3, 1877.

DAVID MITCHELL, M. D.

ILLUMINATING OILS.

MEMORIAL TO THE LEGISLATURE FROM THE STATE BOARD OF HEALTH.

At the meeting of this Board held April 10, 1877, it was thought desirable to express the opinion of the members on the subject of illuminating oils in this State, in a respectful memorial to the Legislature; and the Secretary was instructed to transmit such a memorial to the Senate and House of Representatives. The memorial was as follows:

OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH, }
Lansing, Michigan, April 12, 1877. }

To the Speaker of the House of Representatives:

SIR:—At the late meeting of the State Board of Health on April 10, the Secretary was directed to transmit to the Senate and House of Representatives a respectful memorial, praying that in the interests of public safety the present legal flash-test of kerosene oil for illuminating purposes be maintained. The Secretary was directed to include in this memorial resolutions passed by the Board at its last preceding meeting, as follows:

Resolved, That the great reduction, since the present system of State inspection of illuminating oil has been in force, in the number of casualties from lamp explosions and otherwise through the use of the low-grade illuminating oils, is an indication of the value of such inspection, and of the present test;

Resolved, That a committee, of which Dr. R. C. Kedzie shall be chairman, be appointed by the chair to take such steps as circumstances may require to furnish the Legislature with any information in the possession of this Board regarding the workings of the law concerning illuminating oils in this State, and to act for the Board in endeavoring to maintain the present standard of inspection, so far as regards the flash-test.

The foregoing is respectfully submitted as an earnest remonstrance by the State Board of Health against any reduction of the flash-test for illuminating oil below the present standard of 140° Fahrenheit.

By direction of the State Board of Health,

Very Respectfully,

HENRY B. BAKER,

Secretary.

INSPECTION OF ILLUMINATING OILS.

As an instance of the importance of having an efficient State Inspector of Illuminating Oils, the following occurrence is here mentioned :

In February, 1877, State Inspector Averill saw what looked like dangerous oil passing through Jackson,—the barrels being branded “Inspected and Approved Michigan Legal Test—150,” but no inspector’s name appeared on the barrel. He wrote to the Deputy Inspector at Saginaw, who went to St. Louis, the destination of the oil, and found that the oil flashed at 76°, and burned at 85° F. The merchant immediately returned it, as he had purchased it, in good faith, of a dealer outside the State.

DEATH OF A GIRL FROM EXPLOSION OF A KEROSENE LAMP.

J. S. Caulkins, M. D., of Thornville, Mich., in a communication dated Feb. 14, 1877, gives statements by several persons, relative to the explosion of a kerosene lamp, Nov. 14, 1876, at Copeland’s Mill, township of Arcadia, Lapeer Co., Mich., in consequence of which Estelle Slack, a girl 15 years of age, lost her life. From these statements, the circumstances appear to have been as follows :

The lamp was a large one, with a “sun burner;” being large, it was kept partly filled with water. The statements are made, but also contradicted, that the top of the lamp was very loose, and that the lamp had been filled on the evening of the explosion. The wick would not turn up, and had been in that condition for a long time. The oil was bought at Copeland’s store, and was the same as that used by all the mill hands. One of the men had “had some trouble with a lantern. It did not explode, but blazed up in a frightful manner. The men dropped it, and ran out of the barn; but seeing that it did not explode, they passed a long pole through the ring and lifted it out of the barn.”

The girl was at a neighbor’s, where the woman had broken her leg, and where she had gone that day to do the work. At about 9 o’clock in the evening her mother left her, with the lamp standing on a shelf, and returned home. At about 1 o’clock, news came to the mother that the girl was burned. Her clothes were all burned off her body, except the corsets, and the whole surface of the body was burned to a crust. Her mind was clear and she was able to speak quite plainly, then and in the morning. She died at 4 P. M., Nov. 15. She said that she did not touch the lamp after her mother went away; that she had sat down to read and had gone to sleep in her chair; that she waked up with her clothes on fire and pieces of the lamp in her lap. She ran out of doors and tried to climb the fence, but could not, and fell down by the fence, where she was picked up. The explosion set the sick woman’s bed on fire, but a boy 10 years old put the fire out with a pail of water. The oil was seen on the floor the next morning. The husband of the sick woman was away; she and the girl and boy mentioned were alone that evening.

Whether this explosion was due to the quality of the oil or to the condition of the lamp or to both causes, it shows in a striking manner the necessity of maintaining a high standard for our illuminating oil. Dr. Caulkins says, “The evidence is conclusive that this lamp was unsafe.” Not only is the liability to an accident greater with a low-grade oil, but when an accident occurs, the danger to life, limb, and property is far greater with a low-grade than with a high-test oil. In the case in question, the results might have been even worse if the oil had been—like oil sometimes used in the past—so volatile as not to remain on the floor till morning. Dr. Caulkins justly remarks:

“Meagre as is this account of a most painful accident, it teaches one lesson which we will do well to heed; namely, that it is not safe to use a kerosene oil lamp after the wheel that turns up the wick is worn out, or when for any reason it will not freely turn the wick. When this happens, the charred portion of the wick must extend, every time the lamp is lighted, farther down the tube; and since this charred portion shrinks in size, the whole wick will eventually be in danger of dropping from the tube into the lamp, when, if the oil is *light*, a catastrophe cannot be averted. It

seems to me a probable theory, that in the above case this actually took place, and that the shrunken charred wick dropped from its tube and fired the explosive gases below.

"There is another point in this connection to which the attention of the public should be called and warning be given them. That is the danger of running out of doors with a kerosene oil lamp. The danger is from the condensation of the gases within the lamp, and the entrance of air, by which an explosive mixture is formed within the lamp.

"Kerosene oil lamp explosions, like railroad accidents and deaths from chloroform, are, happily, not of frequent occurrence in the experience of one individual; and, for that reason, the obligation is more imperative on each one under whose notice such an accident falls, to study as carefully as possible the causes.

"The question of the amount of danger from the use of kerosene is vitally important; for kerosene is, and is likely long to be, outside of cities, the world's source of artificial light."

EXPERIMENTS WITH ILLUMINATING OIL.

While the law relating to illuminating oils, printed on pages 80-83 of this Report, was pending, this Board appointed a committee to furnish the Legislature with any desired facts in the possession of this Board concerning illuminating oils, and to ask that the present flash-test be maintained. Some experiments were made by the Secretary, as a member of the above-mentioned committee, with a view to ascertain, if possible, some of the conditions that would produce an explosion in a lamp. These experiments are published here to point out a source of danger in using low-grade oils, which has not heretofore been noticed. It has been the custom to speak of the temperature of the oil in lamps, and to consider that if the flashing point of the oil was above the temperature likely to be reached by the oil in any lamp in ordinary use, there was no danger of an explosion. These experiments show that this is a dangerous error, and that explosions may and do occur when the temperature of the oil in the lamp is far below the flashing point of the oil. This is because a small quantity of oil is constantly brought up the wick in contact with the heated metal tube, and *is constantly being vaporized, if its flashing point is below the temperature of the metal tube.* This is the reason why we need to have a high-test oil in order to be reasonably free from danger from lamp explosions. It is also a reason why it is important that the oil be free from paraffine, which clogs the wick and causes the wick-tube to become much heated. In connection with the experiments—mentioned on pages xxx.—xxxii. of the Report of this Board for 1875—it explains why explosions sometimes occur in lamps from which the chimney has been removed by breaking or otherwise; it is because the wick-tube then rapidly becomes unusually hot, and, under such circumstances, even oil that flashes at 140° F. may form an explosive vapor.

OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH, }
Lansing, January 22, 1877. }

The temperature of the room was 72° F. A kerosene lamp with sun-hinge burner was lighted at 5: 7, P. M.

In twenty minutes the temperature of the collar of the lamp outside was 104½° F.

At 5: 30 the chimney was taken off.

At 5:34 (that is in four minutes), the temperature of the collar was 127° F.

At 5:35 (that is, in five minutes), the temperature of the collar was 137° F.

At 5:35½ the temperature of the collar was 140° F.

At 5:43 (that is, in thirteen minutes), the temperature of the collar was 159° F.

At 5:44 the temperature of the collar was 161° F.

At 5:44½ the vapor flashed, on application of a small flame within the lamp—a lighted match through the filling hole in top of lamp. The flash was vigorous throughout the entire space over the oil. It was just 14½ minutes from the time of the removal of the chimney to the time of the flash.

The temperature of the oil in the lamp, immediately after the experiment, was only 85° F.

The oil became of a milky color just before the explosion, or flash, and remained so afterwards.

The lamp, burner, and wick, were all new and clean. The oil was the “water-white” brand, made by the Standard Oil Company. Its flashing point was 141° F., as proved by my re-inspection previous to the experiment.

This experiment shows that the temperature of the oil in a lamp is not the only factor to be considered; that the lamp may explode when the oil is only at about 85° F., the explosion being caused through the formation of an explosive vapor by heating the small quantity of oil in the wick, or which is splashed up against the collar of the lamp by moving it.

In this experiment with oil that stood our State test—flashed at 141° F.—an explosive vapor was found in the lamp in just 14½ minutes after the chimney was removed, the lamp being allowed to continue to burn. The presence of an explosive vapor was proved by actually exploding it within the lamp. The temperature of the oil was then found to be only 85° F.

In these experiments, the removal of the lamp chimney was to imitate the conditions where, from any cause, the chimney is broken, and because of temporary absence of members of the household, or for other reason, the lamp is allowed to burn for a few minutes thereafter. It will be seen that under such circumstances there may be danger, even with high-test oil, such as the law now requires in this State.

With oil containing much paraffine, the temperature of the collar of the lamp will frequently rise to over 150° F., without the removal of the lamp chimney. Such oil is therefore dangerous at best.

Lansing, Jan. 23, 1877.

The temperature of the room was 70° F.

The temperature of the oil was 69° F.

The oil used was the “Headlight,” Standard Oil Co., said to flash at 120° F. I tested it and found that it flashed at 115°, and burned at 131° F. A new lamp, with sun-hinge burner, new wick, and fresh oil, were used. The lamp was lighted at 4:45 P. M. Within twenty minutes, the temperature of the collar of the lamp was 104½° F., but was cooled every time the oil was thrown up against it.

At 5:10 the temperature was.....102° F.

At 5:20 the temperature was.....102°

At 5:20 the chimney was removed.

At 5:22 the temperature of the collar was.....108° F.

At 5:24 (that is, in four minutes) the temperature of the collar was.122°

which was two degrees higher than its reported flashing-point and 7 degrees above its actual flashing-point. In $7\frac{1}{2}$ minutes the temperature of the collar was 145° , which was 14° above the actual *burning* point of the oil.

At 5:28 the temperature of the collar was..... 146° F.

At 5:30 the temperature of the collar was..... 155°

Immediately after this the temperature was..... 163°

and the lamp was extinguished, because of apparent danger, the jumping of the flame indicating minute explosions at the tube beside the wick. A new stock of courage was soon regained and the lamp was relighted.

At 5:41 the temperature of the collar of the lamp was 165° F., and an explosive vapor was then found within the lamp. The temperature of the oil immediately after the explosion was 80° F., five degrees lower than the higher test oil was found, but this was probably because it had not been so frequently moved in such a way as to bring the oil up against the hot collar of the lamp, as the collar of the lamp was hotter by about 4° than when the higher test oil was used. It should be stated that in these experiments the lamps were kept well filled with oil so that the heating of the lamp was probably less than would occur if the oil was low in the lamp.

Lansing, January 24, 1877.

A lamp with "sun-hinge" burner, filled with oil that flashes at 115° , and burns at 130° F., was lighted at 11 A. M. The temperature of the room was 74° F. The oil used was the "Headlight," Standard Oil Co., said to flash at 120° F. At about 12 M. the temperature of the collar outside was $104\frac{1}{2}^{\circ}$ F.

At 12:11 the chimney was removed.

At 12:15 (that is, in four minutes) the temperature of the collar was. 121° F.

At 12:16 the temperature of the collar was..... 126°

At 12:17 the temperature of the collar was..... $129\frac{1}{2}^{\circ}$

At 12:18 the temperature of the collar was..... $134\frac{1}{2}^{\circ}$

At 12:19 the temperature of the collar was..... 136°

At 12:21 the temperature of the collar was..... $141\frac{1}{2}^{\circ}$

At 12:23 the temperature of the collar was..... 144°

At 12:24 the temperature of the collar was..... 144°

At 12:25 the temperature of the collar was..... 145°

At 12:26 the temperature of the collar was..... $146\frac{1}{2}^{\circ}$

At 12:28 the temperature of the collar was..... 149°

At 12:28 the temperature of the *room* was..... 68°

At 12:31 the temperature of the collar was..... $147\frac{1}{2}^{\circ}$

At 12:31 $\frac{1}{2}$ it flashed.

At 12:37 the temperature of the collar was..... $153\frac{1}{2}$

The temperature of the oil after the experiment was 83° F.

In testing for the flash, and frequently during the experiment, the cover to the filling-hole was removed. This would permit a draft of air to pass in at the filling-hole over the oil and out the ventilating-tube beside the wick-tube. Such a draft would, of course, remove much of the vapor. As this draft does not exist in lamps as ordinarily used, the vapor would probably accumulate more rapidly under such conditions than it did in these experiments.

In order that an explosion may occur, a sufficient quantity of vapor must be formed to make, with the air in the lamp, an explosive mixture. If the oil is "high-test," the wick-tube not very much heated, and the oil in the lamp is cold, the small quantity of heavy vapor gradually formed may be condensed as

fast as formed, and no explosive compound be made; but if the oil is "low-test," that is, vaporizes at a low temperature, the vapor may be generated by the heated wick-tube faster than it can be condensed by the cold oil in the lamp, and then only other favoring conditions are needed for a terrible explosion; experience in this State before the recent laws were enacted, and in other States quite recently, fully establishes the fact that those conditions are frequently present. Experience in this State under the present law, fully establishes the fact that with high-test oil, that flashes at 140° or 150° F., the conditions for an explosion are not very frequently fulfilled, in ordinary lamps.

This Fifth Annual Report is respectfully submitted.

HENRY B. BAKER,
Secretary.

HEREDITY

IN ITS

RELATION TO PUBLIC HEALTH

AND TO LEGISLATION IN THE INTERESTS OF PUBLIC HEALTH.

THE FOURTH ANNUAL ADDRESS

TO THE

STATE BOARD OF HEALTH, OF MICHIGAN,

By HOMER O. HITCHCOCK, M. D.,

PRESIDENT OF THE BOARD.

HEREDITY

IN ITS RELATION TO PUBLIC HEALTH AND TO LEGISLATION IN THE INTERESTS OF PUBLIC HEALTH.

In studying the history and the character of an intimate friend or a well-known acquaintance we are forced to ask, What has made this or that person what he or she is?

This question has, I suspect, of no one ever been fully, definitely, or quantitatively answered.

What are the "preëfficients"* of a man or a woman? What are the forces which develop an individual character and make a personal history?

When we widen the circle of observation to include all the members of a certain family, the problem becomes still more obscure and uncertain; but when the circle is made to include a nation or a race, or all the races of mankind, in all their generations, the problem is vastly increased; and, although the same elements enter into its solution for a single individual as for the race, their combinations are so varied and multiplied that the answer is as doubtful as the responses of the Delphic oracle, obscure as the words of the sybil, and uncertain as the flight of birds.

The "preëfficients" of a man in his entirety—physical, mental, and moral character—are resolvable into three general forces; viz., heredity, spontaneity, and environment.

By heredity is meant, in this paper, that endowment of all living things, whether in the vegetable or animal kingdoms, which tends to make "like produce like." All living things were endowed with this force at their creation. The source of this force is the source of the universe. The original enunciation of it is found in the history of the origin of the universe,—Genesis i. 10, 12, and 24: "And God said, Let the earth bring forth grass, the herb yielding seed, and the fruit tree yielding fruit *after his kind, whose seed is in itself.*" "And the earth brought forth grass and herb yielding seed *after his kind*, and the tree yielding fruit *whose seed was in itself after his kind.*" * * * "And God said, Let the earth bring forth the living creature *after his kind*, cattle and creeping thing and beast of the earth *after his kind.*"

A late writer has thus defined this force:† "Heredity is that biological law by which all beings endowed with life tend to repeat themselves in their de-

* "All that has gone to the making up of,"—a word happily used by Mr. Galton in "English Men of Science."

† Th. Ribot. "Heredity." D. Appleton & Co., 1875, p. 6.

scendants; it is for the species what personal identity is for the individual. By it a ground work remains unchanged amid incessant variation.”

By *spontaneity* in this paper is meant that force in the individual that tends to make him unlike others of his race or family,—his own peculiar self. It is that which gives him a consciousness of individual, personal being, independent of family, nation, or race. It makes the “*ego*” possible,—it is the basis of the “*meum*” and “*tuum*.” It is the *free will*,—the power to weigh motives, to choose one’s line of action, to decide one’s personal character. It is the basis and reason of personal responsibility, and makes necessary, government, law punishment. It was superadded to the endowment of animals by God, when he “breathed into man the breath of life, and man became a living soul.”

Environment includes all those external conditions and influences that modify the character, physical, mental, and moral. It both curbs and ministers to both heredity and spontaneity, antagonizing and increasing their power.

Traits of character markedly hereditary are often greatly obscured or wholly lost sight of under the influence of environment, while, by the same influences, other and new traits are fixed upon individuals, families, and nations even, by habits long repeated, which are then continued by heredity.

Greater force, too, is given to spontaneity by surrounding the individual by influences favoring the development of traits of character peculiarly his own.

Says Ribot: * “Great stress has recently been laid on the influence of the physical environment. It has been shown how the climate, the air, the character of the soil, the diet, the nature of the food and drink,—all that in physiology is comprised under the technical terms *circumfusa*, *ingesta*, etc.,—shape the human organism by their incessant action; how these latent, silent sensations which do not come into consciousness, but still are ever thronging the nerves of sense, eventually form that habitual mode of the constitution which we call temperament. The influence of education is analogous. It is a moral environment, and its result is the creation of a habit. We might even affirm that this moral environment is as complex, as heterogeneous and changeable, as any physical environment. For education, in the full and exact meaning of the term, does not consist simply of the lessons of our parents and teachers; manners, religious beliefs, what we read, what we hear, all these are so many silent influences which act on the mind, just as latent sensations act on the body, and which contribute to our education: that is to say, they cause us to contract habits.”

Heredity, spontaneity, and environment are to the physical, mental, and moral development of the individual, the nation, and the race what the universal law of gravitation is to the unnumbered worlds and systems of worlds in the universe.

Heredity is like the centripetal force. It tends to make all beings exactly like their one original progenitor; while spontaneity, like the centrifugal force, tends to make all beings more and more unlike the original, to rush out of the common orbit into tangent lines, or to make new orbits for themselves; and environment, like the influence of all the worlds of the universe upon each other, tends to modify and vary every individual character, and thus to change the character of a nation or the race.

Of the wonderful tenacity of heredity a late writer has said: “Its law is absolute transmission; and in spite of all obstacles which tend to weaken or

* “Heredity,” p. 346.

destroy it, it struggles on without truce or pause, losing much of its strength as it advances, dissipating itself, so to speak, so as to appear no longer to exist. And yet, when we see the same characteristics reappear, sometimes after a hundred generations, here indeed is matter for reflection. It may be said that heredity verifies in its own way the axiom, 'Nothing is lost.' With its character of unconquerable firmness, of absolute persistency, it appears to us as one of those many inflexible bonds by which omnipotent nature imprisons us to necessity."

The laws of heredity are universal in their operation in the animal kingdom, from the simplest cell multiplying by fission, upwards, through all the gradations of living beings, to the most complex organism.

The more simple the organism the more complete and unlimited is the application of the law, so that in the Hydra or the Nais, for example, the parent cannot be distinguished from its progeny; the same is true also in those animals multiplying by gemmation.

As we rise in the scale of animal life we find the law of heredity modified and limited, in proportion as the organism becomes more complex and the relations of the animals to the outward world more varied, and the influences of environment become stronger.

Hereditary influence manifests itself in every part of the animal organism: in the size and shape of the body, the moulding of the features, the color of the skin, hair, and eyes, and in the size and form of the bones, muscles, and the various internal organs. This law was so marked among the Romans as to give origin to many names of families; *e. g.*, Nasones, Buccones, and Capitones, families among whose members the size and form of the nose, the cheeks, or the head were the marked features. With equal propriety names might be given to certain families from the peculiar development of other organs among their members, such as the chest, the heart, the blood-vessels, the eyes, or the ears. Some families for several generations are characterized by great muscular strength, or agility, or grace of motion, beauty of eyes or hair, unusual fecundity or longevity. So persistent is the law in respect to some of these traits that the most unfavorable environment—as poverty, great hardship, and exposure—fail to overcome it.

The fact that longevity depends far less upon the environment of the individual than upon his inherited tendencies is made available in the calculations of well-managed life insurance companies in estimating the risk upon the life of their applicants.

But not only are physiological traits and qualities hereditary, but anomalous and pathological conditions and traits are frequently transmitted through several generations. The horny excrescences upon Edward Lambert were continued in the male line for five generations. Harelip, supernumerary fingers and toes, and squint-eye, as well as peculiarities of complexion, are often bequeathed to descendants through many generations, as well as the most normal physiological fact.

It is observable that almost every exaggeration of form or physical development is transmissible by heredity. Such exaggeration may be carried so far as to become really disease, or diseased conditions may be firmly fixed upon certain organs, and are then equally transmissible with physiological conditions.

Thus we have certain diseases of special organs which appear to be developed in members of the same stock, generation after generation, as apoplexy, asthma, the various forms of heart disease, and certain diseases of the urinary organs;

while in other families few or no cases of these diseases are to be observed, but for many generations rheumatism, gout, consumption, scrofula, cancer, or various forms of skin diseases prevail among them. The liability to or the exemption from various diseases in certain families are, for several generations, marked characteristics; so that the children may say: "As our fathers did, so do we; we sicken and die of the same disease that it has pleased our ancestors to have or to die of." These tendencies are noticeably increased in children both of whose parents had inherited the same characteristics.

Fortunately also there may be observed a tendency in the law of heredity to come back to the original type, so that even when a new disease has been engrafted upon a family there is a tendency to get rid of it in the greater and greater faintness with which it is transmitted, unless indeed it is reinforced by other strains of blood tainted with the same vicious tendency.

Were it not for this tendency to reversion and the advantage which might be taken of it when reinforced by environment, many families, if not the whole race, would speedily run out. This tendency and the advantages to be taken of it we shall further dwell upon, when we come more definitely to speak of the relation of heredity to laws enacted in the interests of public health.

As all mental developments are so intimately connected with, if not absolutely dependent upon, the physical organization, it is not strange that all psychical traits should be transmitted equally with the physical traits by heredity; and as all forms of mental disease are now believed to be caused by some more or less obscure changes in some portion of the nervous centres, we might readily suppose, what by observation we find to be true, that mental diseases as well as diseases of other organs are hereditary.

No one doubts that primitive instincts are hereditary, and that the law of their transmission is imperious and well nigh unchangeable. But instincts may be modified and new ones acquired; as when the beaver under some circumstances burrows in, rather than build a house above, the ground; and birds change the form of their nests to suit the circumstances which may surround them. Indeed, all of our domestic animals, once wild and some of them fierce, have acquired new instincts which are now, after long domestication, as transmissible by heredity as their original ones.

Normal conditions, as well as abnormal conditions and idiosyncracies of all the senses,—touch, smell, hearing, and sight, are, to the every day observation of all of us, seen to be transmitted by heredity and often through several generations; *e. g.*, different degrees of hyperæsthesia, or anæsthesia, color-blindness, and defects of vision dependent on mechanical causes, such as strabismus, myopia, and presbyopia.

* "Among the most striking cases of heredity of defects of vision is the ever-increasing numbers of the myopic among persons given to intellectual labor. According to M. Girand Teulon, continual application with the eyes near the object is the great cause of myopia. * * * * In England at the Chelsea Military School, among 1,300 boys only three were myopic. In the universities of Oxford and Cambridge, however, the number of myopic subjects was considerable—at Oxford 32 in 127. In Germany the results are even more decisive. Dr. Colin of Breslau undertook the task of examining, in the schools of his own country, the eyes of 10,000 scholars or students. Among them he found 1,004 myopic,—about ten per cent. In village schools they are not numerous,—only a quarter per cent, in the town schools the number of the myopic increases with

* "Heredity," by Th. Ribot, p. 39.

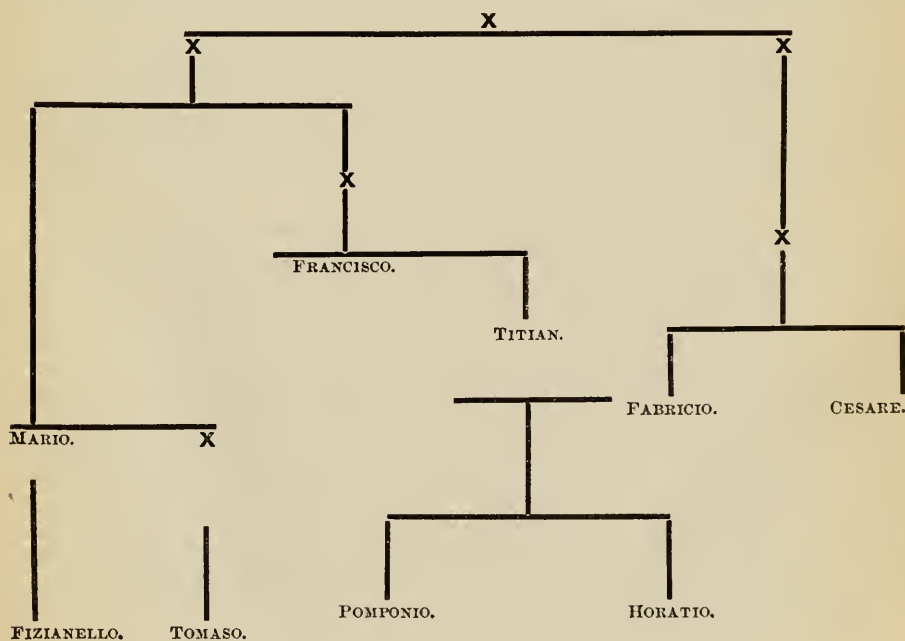
the grade: In primary schools it is 6.7 per cent; middle schools, 10.3 per cent; normal schools, 19.7 per cent; gymnasias and universities, 26.2 per cent. This explains why, in Germany, myopia is not a reason for rejection by the examining boards. Since constant study creates myopia, and heredity most frequently perpetuates it, the number of short-sighted persons must necessarily increase in a nation devoted to intellectual pursuits."

Certain marked powers of memory as well as certain forms of memory are transmitted to offspring, as in the families of some remarkable painters and scientists. Indeed all the normal faculties of the mind, especially if of unusual development, are observed to be subject to the law of heredity more or less completely.

As an illustration of the heredity of imagination, take Coleridge, of whom Galton says: "His son Hartley,—poet,—a precocious child, whose early life was characterized by visions, had an imagination singularly vivid and of a morbid character. His son, the Rev. Derwent,—author,—late principal of the Chelsea Training College.—His daughter Sara possessed all her father's individual characteristics and was also an author, whose son was Herbert Coleridge—philologist.

In music the *Bach family is perhaps the most distinguished instance of mental heredity on record. It began in 1550, and continued through eight generations. * * * During a period of nearly 200 years this family produced a multitude of artists of the first rank. There is no other instance of such remarkable talents being combined in a single family. * * In this family are reckoned *twenty-nine eminent musicians*."

In painting, Titian furnishes an example in whose family, says Ribot, "were nine painters of merit." The following is his genealogy according to Galton:



* "Heredity," by Th. Ribot, p. 63.

Special and marked intellectual characteristics are distinctly traceable as hereditary, both backward and forward in the line of many remarkable persons; *e. g.*, Aristotle, whose father, son, and nephew were distinguished for the same intellectual traits as himself; Sir Francis Bacon and his father, mother, and brothers; Sir Benjamin Brodie, in whose family were six distinguished members; Erasmus Darwin had two sons, Charles and Robert, distinguished physicians, and a grandson, Charles, author of the "Origin of Species"; Herschel, Hunter, Hallam, Macaulay, Grotius, and de Staël, all of whom were born of parents distinguished for intellectual endowments, and among whose descendants or more distant relatives are numbered many persons of like endowments.

The sentiments, appetites, and the passions are equally transmissible with the more purely intellectual qualities; especially is this noticeable when they become uncommon or morbid in their development. Every breeder of animals is aware of and takes advantage of this fact. A vicious and sulky horse will give those characteristics to his colts. "Lord Oxford," says Darwin, "crossed his famous grey hounds, which failed in courage, with a bull dog. * * * At the sixth or seventh generation there was not a vestige left of the form of the bull dog, but his courage and indomitable perseverance remained."

Appetites long indulged to excess may become in their exaggeration morbid passions, and as such are bequeathed to posterity.

The exaggerated appetite for food, which in the gourmand becomes a passion, is transmitted to children; as in the case of "Louis XIV., remarkable for his greediness, which passion has been transmitted to all his sons and to their descendants.*"

There is no neighborhood but that can furnish striking instances of the heredity of the exaggerated and ungoverned sexual appetite, giving rise to vice and crime.

When the appetites become morbid in their craving, as in earth-eating, they present curious instances of morbid heredity. Von Humboldt speaks thus of this morbid appetite and its hold upon the people in some tropical countries: "The people have an odd and almost irresistible liking for a kind of greasy potter's clay, with a strong and unpleasant smell. The children have often to be locked up to prevent them from running out after recent rain and eating clay."

Perhaps the most striking illustration of this part of our subject is to be found in the almost unconquerable power that the appetites for strong drinks and the narcotics have over those who freely indulge them, and the terrible inheritances which they bequeath to their children to the third or fourth generation.

Avarice, or the excessive desire for gain, may be transmitted as such, or it may be metamorphosed into other mental and moral degeneracies.† "In several instances," says Dr. Maudsley, "in which the father has toiled upwards from poverty to vast wealth, with the aim and hope of founding a family, I have witnessed the results in a mental and physical degeneracy, which has sometimes gone as far as the extinction of the family in the third or fourth generation. When the evil is not so extreme as madness, or ruinous as vice, the savor of a mother's influence having been present, it may still be manifest in an instinctive cunning and duplicity and an extreme selfishness of nature,—a na-

* "Heredity," p. 83.

† "Physiology and Pathology of the Mind," by Dr. Maudsley, p. 234.

ture not having the capacity of a true moral conception or altruistic feeling. Whatever opinion other experimental observers may hold, I cannot but think that the extreme passion for getting rich, absorbing the whole energies of a life, does predispose to mental degeneration in the offspring,—either to moral defect or to intellectual and moral deficiency, or to outbreaks of positive insanity under the conditions of life.”

Ribot quotes from Dr. Despine one, but a decisive and striking, instance illustrating the heredity of the tendency to thieving and allied crimes.* “Jean Chrétien, the common ancestor, had three sons,—Pierre, Thomas, and Jean-Baptiste. I. Pierre had a son, Jean-François, who was condemned for life to hard labor for robbery and murder. II. Thomas had two sons: 1. François, condemned to hard labor for murder; 2. Martin, condemned to death for murder. Martin’s son died in Cayenne, whither he had been transported for robbery. III. Jean-Baptiste had a son, Jean-François, whose wife was Marie Tauré (belonging to a family of incendiaries). This Jean-François had seven children: 1. Jean-François, found guilty of several robberies, died in prison; 2. Benoist, fell off a roof which he had scaled, and was killed; 3. X—, nicknamed Clain, found guilty of several robberies, died at the age of twenty-five; 4. Marie-Reine, died in prison, whither she had been sent for theft; 5. Maue-Rose, same fate, same deeds; 6. Victor, now in jail for theft; 7. Victorine, married one Lemaire, and their son was condemned to death for murder and robbery.”

The most recent investigations lead us to believe that all forms of insanity, if not indeed all forms of psychological anomalies, including many moral abnormalities, are but the outcome of some diseased condition of the nervous system. All forms of neuroses, the various developments of mania, monomania, hypochondria, hysteria, epilepsy, alcoholism, and the morbid tendencies to vice and crime, are but congeners or correlatives.

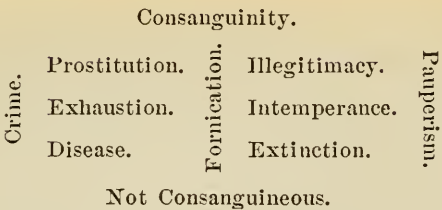
Mr. R. L. Dugdale, member of the executive committee of the Prison Association of New York, in a pamphlet recently published,† has, in a most striking and interesting manner tabulated and studied the history of the progeny of five sisters, two of whom married sons of one whom he calls Max, a descendant of the early Dutch settlers of a portion of the State of New York. One of these women is now known as “Margaret, the mother of criminals.”

“The progeny of these five persons,” he says, “has been traced, with more or less exactitude, through five generations, thus making the total heredity which has been enrolled stretch over seven generations, if we count Max as the first. The number of descendants registered includes 540 individuals who are related by blood to the “Jukes,” and 169 by marriage or cohabitation, in all 709 persons of all ages, alive and dead. The aggregate of this lineage reaches, probably, 1,200 persons, but the dispersions that have occurred at different times have prevented the following up and enumeration of many of the lateral branches.

“Taking a general survey of the characteristics of the family under consideration, an arrangement may be made as follows:

* “Heredity,” p. 91.

† “The Jukes: A Record and Study of the Relations of Crime, Pauperism, and Disease.” G. P. Putnam & Sons, New York.



“In other words, fornication, either consanguineous or not, is the backbone of their habits, flanked on one side by pauperism and on the other by crime. The secondary features are prostitution, with its complement of bastardy, and its resultant neglected and miseducated childhood; exhaustion, with its complement intemperance, and its resultant unbalanced minds; and disease with its complement extinction.”

The author has shown that in these families, whose history he has so carefully studied, there has been an average of six and three-quarters times more pauperism than the average pauperism of the State: the percentage of pauperism for the *whole* family being 22.22 per cent, while the percentage of pauperism among the sick and disabled amounted to 56.47 per cent.

As an illustration of the expense to the State of these hereditary diseases, he mentions that “in one case the hereditary blindness of one man cost the town twenty-three years of out-door relief for two people, and a town burial.” “But,” he continues, “the disease which the facts show to be the most common, as it is by all odds the most destructive and the most subtle and impossible to eradicate, is syphilis.” “Here we find the proportion of those blighted by it reaches 10.86 per cent, but this percentage does not include half of the victims of this class of disorders. On the authority of physicians who know, from twenty-five to thirty per cent are tainted with this disease.”

The records of this family show that not only syphilis, but other diseases more or less related to it, and engrafted upon the stock by its mixture with foreign blood or by unfavorable environment, have been handed down to the children generation after generation until, vitality exhausted, extinction has closed the records of many branches. When the records of entailment of such a disease as syphilis in such a family as the “Jukes” is presented in a tabular and statistical form it is a matter of surprise and horror to most men, and is certainly believed to be exceptional.

But let me quote from the address of the venerable Prof. S. D. Gross before the American Medical Association at Detroit, 1874. He says: “It would be a matter of deep interest, and, in a practical point of view, of the greatest possible value, if we could ascertain, even approximately, the extent of syphilis in our cities and larger towns; but for such a decision there are, unfortunately, no data. It may, however, be assumed that it is of gigantic proportions; that it exists in many of the best and noblest families of the land; that, since the establishment of railway travel, it has penetrated every rural district; and that it is poisoning and slowly but surely undermining the very fountains of life in every direction, sowing the seeds of death among our people, and gradually deteriorating the national health. It is no slander to assert that many of the cases of the disease, brought under the notice of the practitioner, occur in the higher walks of life, among married as well as among single men. Out of a population of forty millions, the present number of inhabitants in this country, it is safe to assert that nearly *two millions are at this moment infected with the*

syphilitic virus. This estimate tallies very closely with that of Mr. Holland, of the number of syphilitic subjects in the United Kingdom of Great Britain; and what is true of that country may fairly be assumed to be true of our own."

"After these appalling figures can we wonder at the enormous rate of infantile mortality which pervades London and other large cities, both of the old and of the new world? Like apples which rot upon the tree before they are ripe, the children of these infected persons drop dead from their mother's womb, or, if they are born alive, they are sure to perish soon after birth."

Of the actual mortality from this disease we have no exact statistics. "But," says Dr. Gross, "taking into consideration the great damage sustained by the general system during the progress of this malady, the malign influence it exerts both upon the blood and the solids, the derangement it causes in the secretions, and the predisposition it establishes to morbid action in the more important internal organs, the mortality must be very great. The mortality from this disease (inherited syphilis) in young children, as already hinted, is very great. In Philadelphia and New York the loss of life from this cause, counted for several years, in children under five years of age, is 80 per cent, if we may credit the statements made by Dr. Sturgis in the *American Journal of Syphilography*. The number of abortions and miscarriages occasioned by the syphilitic poison is incalculable.

"The mortality from syphilis on the Sandwich Islands is absolutely appalling. Dr. John G. Brooks, writing in 1873, affirms that the spread of this disease has been so rapid, and its consequences so fatal, that in less than a century the population has been reduced 75 per cent."

Probably among hereditary diseases scrofula in its various forms stands next to syphilis in its baneful influence upon the human race.

I will now waive the question, as not material to my subject, whether scrofula in all its forms is only a modified development of syphilis. Prof. Gross, with many other distinguished physicians, both on this and the other side of the Atlantic, are strong advocates for the affirmative of this question; while others, and perhaps equally eminent men, as strongly affirm the negative. It is sufficient for my purpose to point out its prevalence, its fatality, and the persistence and almost certainty with which it is entailed as a diathesis to posterity.

"At the present day," says Prof. Gross in the address quoted above, "the affections included under this denomination amount to upwards of twenty. Among the more common are chronic enlargements of the lymphatic glands, various eruptions and ulcerations of the skin, embracing the milder forms of lupus, chronic abscesses, especially psoas and lumbar, Pott's disease of the spine, psorophthalmia, chronic amygdalitis, caries and necrosis, ozæna, certain inflammations of the eye, known as strumous, coxalgia, and white swelling, as it was formerly called, onychia maligna, otorrhœa, rickets, arachnitis, hydrocephalus, pemphigus, sycosis, and keratitis."

Prof. Gross quotes Mr. Richard Barwell to this effect: "That in the United Kingdom of Great Britain scrofula is so common that it would be below the truth to affirm that at least three-fourths of the people have the seeds of that malady in their constitutions."

The scrofulous diathesis is probably chargeable with a large proportion of the deaths attributed to other well-known diseases.

*"Strumosis and tuberculosis have no place in the Registrar-General's Re-

*Sir William Jenner, in "*Practical Medicine of To-day*," p. 42.

turns; and yet to the preëxistence of these diseased states, in a large proportion of cases, is due the death in scarlet fever, in measles, whooping-cough; and but for these states how large a number of cases of Bright's disease, hepatic disease, and puerperal mischief would never have occurred."

According to Jenner, also, rickets causes, primarily or secondarily, more deaths in Great Britain than any other disease of childhood. "Although a preventable disease," he says, "the mortality from rickets, from diseases which would not occur but for the preëxisting rickets, and from diseases which would be trifling but for coëxisting rickets, is enormous. Laryngismus stridulous, chronic hydrocephalus, teething, convulsions, atrophy, diseases of the spleen and liver, remittent fever, tabes mesenterica, spinal disease, bronchitis, diarrhoea, measles, whooping-cough,—these are some of the names under which deaths, really due to rickets, appear in the Registrar General's Returns."

According to the United States Census Report for 1870, there were in a total mortality of 492,263 deaths 69,896 deaths from consumption, or 1 to 7. In Maine the deaths from consumption were to deaths from all causes as 1 to 3.9; and in Michigan, as 1 to 6. These figures show how broad and how deep is the stream called *scrofulous diathesis*, which is continually flowing down the generations, bearing disease, blight, death, extinction.

Judging from the United States Census Report for 1870, which numbers 814 insane persons and 613 idiotic persons in Michigan, and taking into consideration the increase in the population of the State since 1870, and also the probable inaccuracies in those statistics from various causes, there are in all probability at this time fully 1,000 persons in Michigan actually insane, and 800 idiotic. I think it is safe to say that there are 1,000 more persons in the State who have been at some time insane, but who now are not counted such, and at least 1,000 more, who, though they have never been insane, yet can find in their immediate or not remote ancestors the element of insanity.

If such characteristics as supernumerary toes or fingers, and horny excrescences upon the skin, and peculiarities of shape and size of the limbs or any of the organs of the body are persistently hereditary, shall we not believe that the morbid changes of that most delicate and susceptible structure, the brain, which show themselves as insanity, are equally persistent in their entailment?

Thus we have at present at least 3,000 persons in Michigan in a direct line of insanity alone whose inheritance, which they leave to their children, is some obscure cerebral change from a perfectly normal and physiological type, which *may*, on some occasion calculated to bring out the heretofore latent element, or to test the hitherto obscured deficiency, crop out as actual insanity, or, by a metamorphosis of diseased developments analogous to the correlation of forces, give rise to hysteria, epilepsy, idiocy, intemperance, immorality, or crime.

Intemperance may be considered in this connection, both as an effect and as a cause. An inherited neurosis, engrafted upon the parent stock in any one of many ways may give to a person such a sense of exhaustion, such a demand for some nerve stimulant, as to draw him to indulgence in alcoholic drinks with almost or quite irresistible power. On the other hand a deliberate, habitual, or excessive indulgence in these stimulants will often unquestionably "produce a modification of the *nutrition* of the nervous system, which engenders a physical want, when they are withheld, comparable to that of hunger or thirst," and which results in an inheritable diathesis.

Says Dr. W. B. Carpenter:* "There is one class of cases, moreover, in

* "Mental Physiology," p. 363.

which a particular abnormal form of nutrition that is distinctly *acquired* by the *individual*, exerts a most injurious influence upon the offspring: that, namely, which is the result of such habitual alcoholic excess as *modifies the nutrition* of the nervous system.”

In a note Dr. Carpenter adds: “We have a far larger experience of the results of habitual alcoholic excess than we have in regard to any other nervine stimulant, and all such experience is decidedly in favor of the *hereditary transmission* of that acquired perversion of the normal nutrition which it has engendered in the individual. That this manifests itself sometimes in congenital idiocy, sometimes in a predisposition to insanity, which requires but a very slight exciting cause to develop it, and sometimes in a strong craving for alcoholic drinks, which the unhappy subject of it strives in vain to resist, is the concurrent testimony of all who have directed their attention to the inquiry.”

Says Ribot: * “The passion known as dipsomania, or alcoholism, is so frequently transmitted that all are agreed in considering its heredity as the rule. Not, however, that the passion for drink is always transmitted in that identical form; for it often degenerates into mania, idiocy, and hallucination. Conversely, insanity in the parents may become alcoholism in the descendants. This continual metamorphosis plainly shows how near passion comes to insanity, how closely the successive generations are connected, and, consequently, what a weight of responsibility rests on each individual. ‘A frequent effect of alcoholism,’ says Dr. Magnus Huss, ‘is partial or total atrophy of the brain; the organ is reduced in volume, so that it no longer fills the bony case. The consequence is a mental degeneration, which in the progeny results in lunatics and idiots.’” Confirmatory to this opinion is the recorded testimony of the late Dr. S. G. Howe, who testifies that nearly 50 per cent of idiot children in Massachusetts are the children of parents one or both of whom were drunkards.

† “Dr. Morel mentions a man of an excellent family of laboring people, who was early addicted to drink, and died of chronic alcoholism, leaving seven children. The first two of these died, at an early age, of convulsions. The third became insane at twenty-two, and died an idiot. The fourth, after various attempts at suicide, fell into the lowest grade of idiocy. The fifth, of passionate and misanthropic temper, broke off all relations with his family. His sister suffers from nervous disorder, which chiefly takes the form of hysteria, with intermittent attacks of insanity. The seventh, a very intelligent workman, but of nervous temperament, freely gives expression to the gloomiest forebodings as to his intellectual future.

“Quite recently, Dr. Morel had again an opportunity of proving the hereditary effects of alcoholism in the ‘children of the commune.’ He inquired into the mental state of 150 children, ranging from ten to seventeen years of age, most of whom had been taken with arms in their hands behind the barricades. ‘This examination,’ he says, ‘has confirmed me in my previous convictions as to the baneful effects produced by alcohol, not only in the individuals who use this detestable drink to excess, but also in their descendants. On their depraved physiognomy is impressed the threefold stamp of physical, intellectual, and moral degeneracy.’”

Associated with these exaggerated and morbid appetites and passions, and often their congeners or correlatives, are the passions for gambling, avarice, fast-living, various eccentricities, and many forms of neuroses and moral ab-

* “Heredity,” by Th. Ribot, p. 85.

† “Heredity,” p. 86-87.

normalities. *Dr. W. A. F. Brown, Medical Commissioner in Lunacy for Scotland, remarked: "The drunkard not only injures and enfeebles his own nervous system, but entails mental disease upon his family. His daughters are nervous and hysterical; his sons are weak, wayward, eccentric, and sink under the pressure of excitement of some unforeseen exigency, or the ordinary calls of duty."

†"Dr. Howe remarks that the children of drunkards are deficient in bodily and vital energy, and are predisposed by their very organization to have craving for alcoholic stimulants. If they pursue the course of their fathers, which they have more temptation to follow, and less power to avoid, than the children of the temperate, they add to their hereditary weakness, and increase the tendency to idiocy or insanity in their constitution; and this they leave to their children after them."

Intimately associated with the morbid processes and diatheses already mentioned, and either correlated to, or coëxistent with, them stand the two great facts of crime and pauperism, the bane and the burden of society.

It is abundantly capable of proof that a very large majority of the crimes committed in this State are, at least, intimately associated with intemperance, being committed by persons under the immediate influence of strong drink; that in some of them there is, coëxistent with the morbid nutrition of the nervous system which leads to drink, also, an inherited tendency to crime aroused by the indulgence in drink, is altogether probable; while in others the disposition to crime appears to have been actually *originated* by the indulgence in drink.

This tendency to commit crime, like the tendency to insanity, exists in various degrees; and it may be, indeed, probably is, also dependent on some deviation from a perfectly normal condition of the nervous system; and, as such, is as inheritable as insanity, scrofula, or syphilis.

This position is well illustrated and sustained by the case of the descendants of Jean Chrétien, already quoted in this paper,‡ as well as by the records of two branches of the "Jukes" so carefully tabulated by Mr. Dugdale, in one of which 60.71 per cent, and in the other 53.84 per cent, of the males were criminals.

"The number of criminals," says Ribot, "whose ancestors have given signs of insanity, is very great. Verger, the assassin of the Archbishop of Paris, was of this number. His mother and one of his brothers perished prior to his crime, the victims of suicidal mania."

"It were to be wished, in the interest of science," says Despine, "that inquiries should be made as to the progenitors of criminals for at least two or three generations. This would be an excellent means of demonstrating the kinship which exists between those cerebral infirmities which produce the psychic anomalies leading to crime, and the pathological affections of the nerve centres, particularly the brain."§

"Passions," says Ribot, "which are inexplicable so long as they are studied in the isolated individual, find their explanation so soon as we have studied them in their metamorphoses through generations, and brought them under the great law of heredity."

Pauperism, also, accompanies and follows all of these diseases and diseased

*"Mental Physiology," W. B. Carpenter, p. 370.

†Ibid.

‡P. 9.

§Psychologie Naturelle, ii. 983.

conditions, as the wolf or the vulture follows the caravan over the desert, ever ready to devour all who, exhausted, may fall by the way.

Pauperism is the exponent of exhaustion of vitality in families by whatever means that exhaustion may have been accomplished; it is the last stage before extinction; and here, spontaneity having been eliminated, heredity asserts its force unmodified (except as it is strengthened by environment) imprisoning the posterity to necessary dependence.

We have thus far considered heredity in its relation to public health. We have noticed how constant and how persistent are the currents in the various streams of heredity; how new streams of morbid heredity take their origin in diseases developed by unfavorable environment or by willful wrong-doing; and how pure strains of blood are tainted for all the future by mingling with impure; and have, in passing, suggested how vast is the present amount of disease, and how numerous are the deaths, fairly chargeable to tainted blood and the various inheritable neuroses.

We come now to ask by what means this force, bearing disease and early death, crime, pauperism, and extinction to coming generations, can be stayed or modified? What can be done to purify strains of blood already tainted, or keep pure those which are at present so.

The proper answers to these questions have a direct bearing upon the conduct of the life of every person in the land.

All young men and young women, do, as a rule, desire at some time to become parents. They wish to live again in their children, and that their names may be perpetuated through many generations.

That hope, long deferred, in that grand old patriarch, Abraham, was blessed at length with full fruition in the gift of a son; and the sublime and terrible trial of his faith was rewarded by the promise of the covenant, "and in Isaac shall thy seed be blessed," and "thy seed shall be as the dust of the earth," "and in thee and in thy seed shall all the families of the earth be blessed."

Men and women—young men and young women,—who do not have such hopes, are unnatural, they are diseased or depraved.

Mr. Darwin has given origin to the expression "the survival of the fittest," containing a truth which, if it does not prove his "development theory," certainly illustrates and explains the progress and the development of the generations of men.

If the desire for children, and children's children through many generations, is natural and really lies at the basis of the family relation, that desire should certainly be so qualified as to include the idea of *normal healthy children*.

We know by what means to secure sound and healthy young from our domestic animals. We always look to the health of both parents, expecting that the qualities of the parents will be given to their young.

Is there any other law of descent in man than in animals? Can we expect to see healthy children from parents both of whom are unhealthy? Is not the descent of children of far more consequence than that of the beasts?

But it may be said, there is hardly a human being but that has inherited and will entail some morbid quality. We must then start with persons, both male and female, in whose blood the latent elements of some disease may be supposed to lurk. The problem is to eliminate the morbid diathesis and establish a healthy stock.

Ought those persons in whom is a strongly marked tendency to disease to marry? or, if married, ought they to have children? We can readily name

several morbid diatheses which almost all persons agree in saying should forbid marriage or at least progeny,—idiocy, complete or even partial, hereditary pauperism, epilepsy, and insanity, when actually developed in the individual at or before the marriageable age.

Ought a person who is conscious of having had or inherited syphilis to marry and have children? Is a person once tainted ever completely freed from the syphilitic poison?

Certainly the greatest care should be taken not to bring together by marriage two streams of heredity which are alike or which are correlatives. A husband and wife, both of whom have an inherited tendency to scrofula, consumption, insanity, or alcoholism, or its correlatives by metamorphosis, may indeed have children, who, in infancy and in early childhood, may give promise of health, but are almost certain, if they survive infancy, to perish in adolescence or to come to maturity with bodies doubly charged with the germs of disease.

If young men or young women are conscious of having some hereditary tendency to disease they should by all means, if they marry at all, seek partners of a stock as free from every hereditary morbid tendency as possible, and especially those free from the same diathesis as themselves.

Mr. Galton, in "English Men of Science," says that the history of the families among which he found the eminent men mentioned in his book, shows that purity of blood is a marked element in their heredity. He speaks also of the folly of "falling in love," as it is termed,—a state of mind often wholly unaccompanied by an intelligent action of the will, based on that careful judgment which takes cognizance of all those most important facts which lie at the foundation of a happy married life and which determine, to a great degree, the physical and mental constitution of the children and their entire welfare.

If either party to a marriage is conscious of having some hereditary tendency to disease, the most careful and judicious hygienic efforts should be made to eradicate the tendency to disease, if scrofula or consumption, or at least to keep it from actual development. If children are born their environment should be made the best possible,—including pure air, dry soil, sunlight in the house, warm clothing, the best and most nutritious diet, and cheerful social surroundings.

If insanity be the taint, the greatest care should be taken to conduct the social, mental, and spiritual life of the party so as to avoid so far as possible all extremes of exaltation or depression. Let such persons pursue "the even tenor of their way." In the management of the education of children born of such parentage the most careful forethought and circumspection should be used, not to crowd the faculties with too severe or exciting tasks, and, above all things, to lead the children to a steady perseverance in a judicious course of study.

Here is a field, mental hygiene, which I am sure has been too little cultivated. My space is too limited to do more than merely hint at some of its important principles, which, if properly and ably developed and carefully and judiciously applied, will do much towards eradicating from many families a taint of insanity which now hangs over them like the sword of Damocles.

To the intelligent and attentive listener the voice of heredity is heard above every other, calling for wise legislation in the interests of public health, in many directions. It proclaims the truth that the wisest legislation for this purpose will look quite as much to the welfare of our children as to that of ourselves.

It illustrates and explains how many nations have become effete and actually have disappeared, by showing that families do often become extinct in conse-

quence of morbid diatheses engrafted upon a healthy stock, perchance through some of the "follies or indiscretions" of youth or the willful self-indulgence of mature life, increased by unwise intermarriages and unfortunate environment.

* "These organic causes will probably be ignored for some time to come, but our ignoring them will not do away with them. The most amazing instance of decay presented by history is that of the Lower Empire, tracing step by step this degeneration through a thousand years; seeing in their works of art, the plastic talent of the Greeks fade away by degrees, and result in the stiff drawing, and in the feeble, motionless figures of the Paleologi; seeing the imagination of the Greeks wither up and become reduced to a few platitudes of description; seeing their lively wit change to empty babbling and senile dotage; seeing all the characters of mind so disappear that the great men of their latter period would elsewhere pass only for mediocrities—it appears to us that beneath these visible, palpable facts—the only facts on which historians dwell—we discern the slow, blind, unconscious working of nature in the millions of human beings who were decayed, though they knew it not, and who transmitted to their descendants a germ of death, each generation adding to it somewhat of its own."

The influence of heredity suggests the possibility of some legislation looking to the regulation of marriages in the interests of public health—not hasty, ill-considered legislation, justified only by the fact that our ancestors forbade the marriage of cousins or other near relatives—but careful, thoughtful, well-considered legislation, forbidding or impeding certain marriages whether between relatives or others; provided such marriages would bring together two streams of the same morbid heredity, as insanity, consumption, syphilis, or intemperance, or two marked morbid diatheses of different natures, such as insanity and consumption, or syphilis and intemperance.

Such legislation should be based upon legitimate deductions from a large number of authentic recorded facts, which, unfortunately, we do not at present possess.

Ought not the field of inquiry of the Census Bureau to be greatly enlarged so as to embrace such questions as these; viz.: "What are the facts in regard to the children of intermarriages of near kin?"—"Is not the only element that makes the children of near kin diseased the combined streams of morbid heredity in the parents?"—"What are the actual facts, by percentages, as to insanity, consumption, scrofula, intemperance, crime and pauperism, being hereditary?" "and what are their congeners and correlatives?"

The force of heredity shows the importance and necessity of wise and prudent legislation looking to the restriction or prevention of intemperance,—that most fruitful source and feeder of streams of morbid heredity,—which projects its malign influence through the coming generations, appearing in them as intemperance again, disease, insanity, idiocy, crime, pauperism, and extinction.

To give origin and force to the wisest legislation in this field we need statistics upon very many points where we now have vague rumors, uncertain inferences, or the wildest assertion without any demonstration.

The force of heredity, also, challenges the attention of our law-makers with respect to the suppression or restriction of syphilis, that dreadful attendant upon the great "social evil,"—eating, as doth a canker, into and sapping the vitality, and endangering the continuance of the race.

* "Heredity," p. 305.

Does a wise forethought dictate legislation actually prohibiting prostitution, or licensing it under certain restrictions and hygienic oversight? Will the best results be obtained by licensing prostitution with a medical supervision of all prostitutes, or by requiring men who patronize them first to submit themselves to a medical examination and procure from the proper medical officer a certificate of soundness?

Whatever views may be taken upon these questions, certain it is that the welfare of coming generations demands that some wise and efficient legislation should be adopted looking to the reduction, if not the entire elimination of this fearful element of morbid heredity.

Our subject has a legitimate bearing also upon every branch of the treatment of criminals and the management of our penal and reformatory institutions, especially the Reform Schools and our State Public School, where are gathered so many children, who, if they have not directly inherited from their parents a morbid tendency to crime, have early shown that they have unbalanced minds and organizations which require the most favorable environment and judicious and careful training to keep them from careers of vice and crime.

Education,—practical education, made pleasant and entertaining,—industrial training wisely adapted to the individual children, will do much towards curbing any morbid heredity, and the healthful development of the moral nature, will in most instances not only antagonize the old, but will establish a new and a normal, heredity.

Let us for a moment consider what are the relations of heredity to the labors of this or any other State Board of Health.

What does the law establishing this Board assign to it as its duties?

First. "To have the general supervision of the interests of the health and life of the citizens." Shall we confine this duty to the present citizens of the State, or by a more general, far reaching, and intelligent apprehension of our duty, shall we conclude that all efforts are required of us which may in any way affect and benefit the *future citizens*?

Second. "They shall especially study the Vital Statistics of this State and endeavor to make intelligent and profitable use of the collected records of deaths and sickness among the people."

What then are the vital statistics of a state? Are they not, when properly collected, the real accounts current of the vitality of her citizens? and when intelligently and skillfully compiled, do not the tables enable the prophetic to cast with great certainty the horoscope of the future generations of citizens?

It is indeed of considerable interest to know how many people in every 1,000 die in a single year; but of what paramount interest is it to know of what diseases they die, and especially how prevalent certain diseases are among the living; or, in other words, to know in the blood of how many who are, or may be parents, the germs of disease float, which in future generations will bear increased harvests.

What does the 'careful study' of these statistics mean but *to point out by skillfully compiled tables of authentic records of disease and death, all the elements which threaten the welfare, strength, and health of the coming citizens of the State?*

What more "intelligent and profitable use of the collected records of deaths and of sickness among the people" can be made, than by their aid to point out the strains of blood contaminated by hereditary morbid diatheses, cautioning against their continuance, and explaining how the morbid element may be

eliminated therefrom, or pointing out the means by which blood at present free from certain morbid elements may be kept so?

Third. "They shall make sanitary investigations and inquiries respecting the causes of disease, especially epidemics."

Does this mean that we shall investigate and inquire respecting such causes only as, acting from without, directly produce disease and death, and not those causes inherent in the people themselves,—taking their origin prior to the birth of the persons in whose blood they creep with stealth, ready not only to bring disease and death by a "mysterious providence" upon the present victims, but to throw a malign influence forward even through the "third and fourth generations?" Was there ever an epidemic, however general or however fatal, fraught with such fearful consequences to any nation as certain hereditary diseases? Epidemics rage for a short period only. Extinction of families alone sets bounds to the dreadful consequences of hereditary diseases.

Fourth. "They shall make investigation and inquiries respecting the causes of mortality, and the effects of localities, employments, conditions, ingesta, habits, and circumstances on the health of the people."

What causes of mortality challenge our investigation and inquiry with such fearful importunity as inherited scrofula, consumption, insanity, and syphilis? Where small-pox, cholera, or the plague have slain their thousands, scrofula, consumption, and syphilis have slain—are slaying, and will continue to slay—their hundred thousands, as hidden causes only of infant mortality.

The immediate effects of "localities, employments, conditions, ingesta, habits and circumstances" upon the citizens of *to-day*, whether as to life or death, is of small consequence when compared to their effects in causing malnutrition of the nervous system; in establishing a morbid diathesis, engrafting disease upon the organism, to be entailed upon the offspring; or in undermining or exhausting the vitality of families so as to entail intemperance, crime, pauperism, and extinction.

At the organization of this Board, in giving an introductory outline of the prospective labors and duties of the Board, I mentioned, among other things, "and most especially to point out the vast importance, to the welfare and perpetuity of the State, of properly rearing, training and educating the young." After four years of unpaid labor in this cause, in view of the subject I have here but too feebly presented to you, as then I "welcomed you to," so now I bid you God speed in "this work, grand, self-sacrificing, and sublime."

KALAMAZOO, April, 1877.

LABELLING MEDICINES.

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REPORT TO THE

STATE BOARD OF HEALTH,

BY

PROF. R. C. KEDZIE,

COMMITTEE ON POISONS AND SPECIAL SOURCES OF DANGER TO LIFE AND HEALTH.



LABELLING MEDICINES.

At a recent meeting of the State Board of Health "the subject of the better protection of the people against accidental poisoning by means of misplaced bottles, improper labelling, etc.," was referred to this committee.

Any one who has attentively read that wonderful note-book of daily life, the newspaper, cannot have failed to observe the large number of accidents that have occurred from taking by mistake the wrong medicine. Sometimes the accident has occurred because the medicine was improperly labelled, but *usually because it was not labelled at all*. The person trusted to his remembrance of the medicine, the memory perhaps assisted by the position in which the bottle is usually placed; but it is very unsafe to identify a medicine by the position which it usually occupies. The bottle may be misplaced and one of very different properties take its place. A prominent politician in Detroit lately took a swallow of extract of *cocculus Indicus* instead of bitters in this way, and came near losing his life by this exchange of position in similar bottles. Occasionally we hear of accidents in dispensing medicines in drug stores from the circumstance that the clerk trusts to the fact that a given medicine is supposed to always occupy a given place on his dispensing shelf, and does not verify his supposition by actual examination of the label on the bottle. By some casual disarrangement of the bottles the most deplorable results have occasionally occurred in this way. But a druggist who will trust to so fallible a means of determining the nature of the medicines he is compounding as the mere position of the bottle, without taking the simple but necessary precaution of reading the label, is unfit to tamper with the lives and health of a community. Such cases are spoken of as accidents, but the public are rapidly coming to the conclusion that preventable accidents are crimes. No one is assuredly safe who trusts to the position of a bottle as indicating the nature of its contents. In the case of all active medicines and of all poisonous substances, whether medicinal or not, some more reliable means of identification should be adopted, and this one entirely abandoned.

Many persons trust to the physical appearance of a medicine to determine what it is. But many medicines of very different properties may have similar physical appearances. Castor oil is a common domestic remedy; oil of vitriol, or concentrated sulphuric acid, is an oily liquid which may easily be mistaken for castor oil, but the effect of giving a tablespoonful of oil of vitriol would be very different from giving the same quantity of castor oil. A friend told me of a case which came under his personal observation. A young mechanic had a bottle of castor oil, and another of oil of vitriol in the same cupboard. His

child was unwell and the mother decided that a dose of oil was the remedy needed. The child was usually very averse to taking medicine, and it had to be poured down his throat notwithstanding his resistance. The oil was poured out and the husband called in to help administer the dose; he held the child while the mother poured down its throat a tablespoonful of oil of vitriol! The child soon expired in great agony. These parents discovered too late that it was not safe to judge of the medicinal properties of a substance by its physical appearance.

Epsom salts and oxalic acid have a similar physical appearance; but one is a safe medicine, while the other would be a deadly poison if given in the liberal doses usual for epsom salts.

But the most striking illustration of the unreliability of physical properties in determining the nature of a medicine is shown in quinine, morphine, and strychnine. As usually found, and especially when the crystals are broken by handling, they are not to be distinguished from each other by their physical appearance, as they are all white powders; they are all very bitter to the taste, and are not to be distinguished readily by this test. Yet their effects upon the animal system are exceedingly diverse, and the quantity which might be safely administered is also very different. What would be a safe dose of quinine would be a very dangerous dose of morphine, and a deadly one of strychnine. Yet it is not uncommon to find these medicines in families without any label or mark to distinguish them—nothing but the unreliable memory of the person who obtained the powder. The instances where morphine has been administered in poisonous doses on the supposition that it was quinine are astonishingly frequent. Strychnine has also been administered in fatal doses on the supposition that because it was white and bitter it must be quinine. A young man near Ionia was taken with a severe ague chill; search was made for quinine, and a small white powder, very bitter to the taste, was found in the house and supposed to be quinine of course; as such it was administered; the young man was thrown into violent convulsions and soon expired. The stomach was sent to me for analysis, and I found it still contained enough strychnine to kill two men!

To keep in the house such medicines without being properly labelled is most reprehensible; to administer them without knowing what they are, is criminal rashness. I would not be understood to restrict my condemnation of the administering of unlabelled and unknown medicines to the three I have instanced, but would extend it to all medicines that have not been properly labelled, or whose composition is not known with absolute certainty. Perhaps I cannot do better on this topic than to quote the following letter from a queer old doctor:

DR. BLUE PILL TO HIS NIECE POLLY.

DEAR POLLY: Your note saying John had concluded to move and that you are busy in packing up your household goods is just received. You ask what to do with the contents of your medicine box; that you have a good many medicines the exact uses of which you have forgotten and you neglected to label them at the time of their use, and you are not certain what they are and what they are good for; but as they once were useful, cost money, and may still be valuable, you do not want to waste them. "But what shall I do with them?" *Burn them, Polly! Burn every blessed powder, pill, tincture, and syrup you have, which is not so marked and labelled that you know just what it is and what it is good for.* Do you say that this is sheer waste of what cost money? Then take them to some good chemist and get him to analyze them so that you may know just what they are,—he won't charge more than \$5 to \$10

for each analysis. "What! give \$5 to analyze some stuff that did not cost more than a dollar? That would be saving money with a vengeance!" Just so! But suppose you save your precious medicines, and some day John has an ague chill and you do not think it is worth while to send for a doctor; all he needs is a few doses of quinine, and you give him what you guess is quinine but is really strychnine, and John is doubled up like a whip-cord with convulsions and dies before you can say Jack Robinson,—how much have you made by the operation? Or suppose baby has the colic, and you give a little of what you suppose to be laudanum but what turns out to be extract of veratrum, and baby vomits himself to death or dies in a fainting fit? The fact is, funerals are costly affairs if done up in style, and life itself is worth something if you look at it in the right light.

Polly, burn up the whole blessed lot. Do not try to save money and run such terrible risks. Besides this, you dose your family too much. If any little colic or childish ailment overtakes them, down goes a dose of something whether necessary or unnecessary. You do not feel that you have done your motherly duty unless every ailment "receives its just recompense of reward" in the shape of a dose of something. You are tempted thus daily. Remember that wonderful little prayer you repeat so conscientiously every morning, and when you say "lead us not into temptation," think of your temptation to dose, and burn up the old medicine box.

Did you ever stop to think what a misfortune is the feeling that you must be forever dosing in order to keep well? God never made our throat a mere tunnel down which to pour nauseous medicines. Remember the epitaph on the Spaniard's tombstone: "I was well, wanted to be better; took physic, and died."

If any of you are really sick, send at once to some doctor who is chockfull of common sense instead of awful Greek words and wonderful cures, and let him say what is the matter and what to do. If he does not give a particle of medicine, but only says "Jemmie must not eat green apples and sweetcake,—only bread and milk,—and he will come out all right in a day or two," do not feel that you have been cheated out of a few doses of medicine. If the doctor can cure you with medicine, *well*; if without medicine, *better*! But while you are sick let the doctor decide what shall be done; when you get well I need not say that you will take the reins in your own hands.

Now you may call me all the hard names you please; it won't hurt me, and will relieve you somewhat. I always like to see folks enjoy themselves and "speak their mind." But whatever you say or do, burn up all the medicines you have that are not distinctly and accurately labelled, and then remember

I am your crabbed but loving uncle,

BLUE PILL, M. D.

It has been proposed in the American Pharmaceutical Association, I believe, to have bottles made of different and characteristic forms for different kinds of medicine; one form where the medicine is designed solely for external use, another form for those containing medicines for internal use, a third form when the medicine is of a dangerous quality unless carefully administered, etc., etc. One claim made for these variously formed bottles is that they may be distinguished by the touch and thus recognized in the dark. My advice is not to go in the dark in any sense on so important a subject. If a person is sick enough to require medicine, he is sick enough to require a light by which to administer the remedy.

Besides this, the bottles, when once emptied will be cleaned up by the housewife and then filled with other medicines, and all possibility of identifying the nature of the medicine by the form of the bottles would cease speedily in most families. The bottles might become a source of danger instead of safety in such cases.

Since this report was written, the following illustration of the danger of using unlabelled medicines has appeared in the public prints, and I insert it here:

POISONED.—The Ovid Register says: The wife of Frederick Crauson, of Duplain Township, one of the first settlers of the county, came to her death suddenly on Friday last, at the age of sixty-nine years, under the following

painful circumstances: Feeling somewhat indisposed at the time, Mrs. Cranson thought she would take a dose of quinine, and stepping into the pantry swallowed a quantity of strychnine that had been purchased for poisoning rats an indefinite length of time previously. Spasms immediately ensued, and in fifteen or twenty minutes, and before any assistance could be rendered, she was dead. The poisoning was purely the result of mistake or forgetfulness, as a neighboring lady who had called upon her, having expressed an intention of taking some quinine, Mrs. Cranson informed the visitor that she had the article in the house and invited the lady to partake of it, which she fortunately declined, and left the house as Mrs. Cranson proceeded to take herself what she undoubtedly supposed to be quinine.—*Detroit Free Press, August 21.*

In my opinion the only safe and feasible way to prevent accidents in the use of medicines is to *label every medicine*, giving the name and dose of the medicine. If a medicine is not worth labelling it is not worth keeping; LABEL OR BURN ! But if for any reason a medicine has lost its label or has never been labelled, never administer it to any person or animal in whose happiness, health, or life you feel any interest or care. Never trust to your memory, on this subject, or to the position in which you usually place a given bottle of medicine. *Be sure you are right before you go ahead in administering any medicine whatever.* The subject is so important that I repeat the warning: LABEL EVERY MEDICINE AND EVERY SUBSTANCE WHICH BY ANY POSSIBILITY MAY BE MISTAKEN FOR MEDICINE; NEVER ADMINISTER AS MEDICINE ANY SUBSTANCE OF THE COMPOSITION OF WHICH YOU ARE IGNORANT OR IN DOUBT. The patient may possibly die for want of medicine, but you have the consolation that he did not die by your act; but if he dies because of some substance which you have mistakenly administered as medicine, your soul will be harrowed with unavailing remorse, more bitter than death, and more cruel than the grave!

AGRICULTURAL COLLEGE, August 15, 1877.

RECREATIONS

CONSIDERED WITH REFERENCE TO

THEIR INFLUENCE ON HEALTH.

AN ESSAY, READ AT THE ANNUAL MEETING OF THE MICHIGAN STATE BOARD
OF HEALTH, AT LANSING, APRIL 10, 1877,

BY REV. CHARLES H. BRIGHAM,

MEMBER OF THE

STATE BOARD OF HEALTH,

AND ITS COMMITTEE ON OCCUPATIONS, RECREATIONS, ETC.

RECREATIONS AND HEALTH.

AN ESSAY, READ TO THE MICHIGAN STATE BOARD OF HEALTH, APRIL 10, 1877,
BY CHARLES H. BRIGHAM.

Work and play are usually brought into sharp antagonism in our familiar speech, as if each excluded the other, and there were between them only the relation of opposition. They are viewed as conditions of life essentially hostile,—the one as a state of toil and bondage, the other as a state of ease and release. The popular notion of heaven is that it is a state or place from which all work is put away, in which there is only enjoyment. Even in the opposite place or state, work is equally put away, in hell there is nothing but suffering and misery. The Greek Tartarus, indeed, made hard work part of the torment: Tantalus reaching vainly for fruits, and Sisyphus rolling his stone, were wretched forever in their endless toil. But the Christian contrast between the final state of soul and the present state of soul is mainly between the active and passive states. Work is the law of the earthly life, pleasure is the law of the heavenly life; and however much work may be urged as a blessing, the time is predicted when work shall come to its end, and only rest and leisure shall remain. In the golden streets there will be no need of repairs, and the happy ones in their bliss will not have a highway tax to work out, as they have in these mundane regions where the pavements are of wood, or stone, or gravel. The occupation there is not work. It is only infinite and never-ending play.

To the grim Puritan work was not only the law of human life, but the tyrannous and exclusive law. In this short scene of probation a man had no right to waste his time in vain amusement, or to anticipate the time of the disembodied life. Sports were not to intrude into this scheme of service. Every moment must be spent in useful labor. Work was the heritage of the race, and the only duty for mortal men in this mortal life. Play of any kind was the destruction of soul. This Puritan idea never did, and never could, overcome the natural instinct of men; could not banish the smile, or hinder the sense of the ludicrous where God had given a genial temperament. The babies of the Puritans had their sports and their mischief, which could not be whipped away, even by those who were most strict in obeying Solomon's maxim of the rod and the child. No theory has ever been so rigid that seasons of enjoyment and methods of enjoyment have not had recognition in it. Those who could not get recreation from the sports upon the green, or the loud laughter in the

gatherings, have been allowed to find it in the meetings for prayer and in the decent psalm singing. Nay, the fact that the Puritan assigned psalm singing as the delight of heaven is a proof that he accepted this as an earthly recreation. It was an interval of play in the course of his conscientious and steady work. And the joy of this religious amusement continually denied the feeling which was heavy in so many devout souls that all joy was sin, and that any sense of pleasure in life ought to be confessed and lamented.

No one now pretends to hold any theory of that kind. Recreation now is regarded as a condition of life as honorable, as natural, as proper, and as useful, as the condition of work. The nursery distich about play and work is taught as sound philosophy. Recreation is just as necessary as labor. Without seasons of play work is spoiled of much of its value. Jack becomes a dull boy when he does nothing but work, and a "dull boy" is not better than a "mere toy." Into every wise scheme of training recreation enters, and the life that allows no opportunity for this is only a prolonged suicide. As the Hebrew preacher tells, there is a time to laugh and a time to dance, as well as a time to plant and a time to build up. To make one capable of efficient work, there must be a chance to play. This is equally necessary, whatever the kind of labor may be, whether it be with the brain or with the hand, whether it be hard work or easy, light work or heavy. The physiologist tells us, that there can be no safety unless there shall be some kind of relaxation; that even when there is variety in work, there must be something which is not felt to be work, and has not that quality; that amusement is just as much an element of spiritual health as the most congenial toil; and that it is a woful mistake for any to say or to feel that they have no need of recreation or can get along without it altogether. A child who never plays is not what a child ought to be, however diligent he may be in his studies, and is a portentous phenomenon, even when his loving parents parade his wonderful precocity; and a man who never plays, and never cares to unbend, is only half a man, even if his capacity be conspicuous.

But is there necessarily any distinction between work and play, it may be asked. Are not the same faculties, physical and mental, exercised in both? Do we not use the same muscles, nerves, senses, voice, and hand and foot, and brain in one as in the other? What is there peculiar in play? Is it any more than a slightly different arrangement of materials, a slightly different combination? Why cannot work pass into play without any actual change? Does not recreation, continued by form and rule, become very hard work? Military drill, for instance, at first good fun, becomes in a little time irksome penance. The son of the house thinks it delightful to sweep out the store in the morning, but the apprentice hates it; it is vexatious drudgery, and it will be nothing else, even if he is pious, and has read old George Herbert's lines about the servant and the fine action which comes in obeying the clause about the Divine law. Work and play may be identical in the material which they use, but they are not identical in the feeling which they arouse. The man who feels no fatigue in a day's hard tramp with a heavy gun on his shoulder, will dread the fatigue of half a dozen miles of walk in the way of duty. No amount of will and resolution can transform into play what is felt to be work, the task and the appointment of the day's toil. That one loves work and is constitutionally industrious, does not transmute the labor into recreation. A task is not a game, however hard one may make believe that it is. And when one finds that the sport which he has taken up is really hard work, he becomes disgusted with it.

And the best benefit of play is realized only when we have the feeling that this is not work and has not the end of work; when we do not ask in our enjoyment what profit there is to be in this, what income it will bring; when it is pleasure for pleasure's sake, and not with any ulterior end of gain. When pleasure becomes business, then it ceases to be pleasure. The pleasure in winning matches at base ball is very much alloyed, when the prize-money is the main thing; or perhaps the club wins the money by proxy, by picked players whom they hire and pay for their service. It is quite possible to make work out of pleasure, even more than it is possible to make pleasure out of work. Dancing, for instance, is an amusement which most persons take as a play the farthest off from work. Yet there is just as much drudgery in keeping a dancing-school as in keeping a grammar-school or in working in a machine shop. And we sometimes see individuals who take up sawing wood as the most healthful of pastimes relinquish it in a little time as the most hateful and wearisome of all pleasures. Men cannot be beguiled by the argument that play is the same thing as work, and that if they only have work enough they have all the recreation that they need: that sophistry cannot deceive. Those peasants upon the Nile are not reconciled to their toil in lifting the shadoof, because every traveller who goes up that river is eager to try his skill in raising those buckets, and showing how easily it is all done. It is sport to the traveller, but it is pain and weariness and death to the workmen. Work is not merely play under a changed name. There is an essential difference in the idea.

An accurate classification of recreations as to character and value is not easy to be made, and there is no rule which we may safely follow. There is no absolute criterion of judgment. Recreations vary according to *age*. What are good for children may not be good for men and women. The sports of boyhood would be intolerably tedious to manhood, not to say most inappropriate. An octogenarian on skates is a pitiful object, and he deserves the derisive laugh when he measures his length upon the ice. When Mr. Dick, as in Dickens' story, finds his joy in flying kites, he is fit for a lunatic hospital. Mrs. Bardell's little son may play at "alleytors" and "commoners," with "knuckledown;" but Mr. Pickwick's good sense is badly impaired, if he is moved to join in that sport. It is ridiculous business for a full-grown man or woman to carry about a doll, even if its name be the "Bambino," and it be a doll of miracle. When one becomes a man, he puts away childish things, in sport as much as in thought. The games of childhood are not only much more numerous than those of manhood, filling more time, but they are different in kind from those of manhood. The difference here is not merely a difference of proportion, but a difference of fact. And when we see a people like the Italians, perhaps, holding on in mature years to the sports of infancy, we have slight hope of manly self-government and self-respect from such people. They seem like overgrown children, from whom no great thing is to be expected. The shouts which echo in the noise of the groups in Rome and Naples are not much more than the jargon of school-boys, mimic contests of boys in their play.

2. Recreations differ, moreover, according to sex. Even the most enthusiastic advocates of woman's rights will hardly insist that the sexes naturally find pleasure in the same things. The question of sex goes into recreation as into work, and sisters find themselves separate from brothers in the things which give joy. This line of sex, indeed, is less marked and positive than it was some years ago. Sports are now allowed and favored for women which a former generation would not have tolerated for them. They skate and they

swim, and they even shoot with gun and pistol, as in the days of chivalry they shot arrows at a mark, and vied under the greenwood with Robin Hood and his archers. Yet in spite of this larger liberality, there is a marked separation in the sports of the sexes, marked by inclination as well as by social custom. Some sports which exhilarate one sex are stupid and unmeaning to the other, as much in childhood as in adult life. The needle-work, which is the running accompaniment to most of the pleasure of women, is weariness of flesh to every man who has not been trained as a tailor. And happily, very few women in civilized lands can find that enjoyment in chewing the Indian weed, which is such a sweet morsel upon the tongues of husbands and brothers. While there are numerous sports which the sexes can keep in common and can enjoy together, there are others which belong to the sexes apart, and cannot be shared or mutually appreciated. The character of the amusement which the man prefers goes very far to show whether or not he is effeminate; whether, like Mr. Angelo Cyrus Bantam, he is dear to lovers of the ballroom as an "M. C.," "Master of Ceremonies," or like Mr. Gladstone, is an "M. A.," "Master of Arts," from Oxford.

3. A third ground of difference in recreations, is *climate*. Some of the most exciting and health-giving of sports can only be enjoyed while the atmospheric conditions are favorable. They must vary with the general temperature of the place or with the season of the year. There are sports of hot regions and of cold regions, of the summer and the winter. To commend *skating* to the Egyptians and Hindoos would hardly be judicious, since they know ice only as the costly luxury for keeping food and for cooling drinks. To be sure, now that parlor skates are coming into fashion, and rolling wheels are taking the place of the gliding irons, the counsel is not so preposterous, and the hot regions may be blessed by this supple motion, appropriate to the lands of snakes and lizards. But there are certain sports of which it cannot be said that they have all seasons as their own. There is a periodicity in pleasure, known to the boys in the household, and not unknown to children of a larger growth,—known to the American Indians, as to the youth of the cities. Spring brings its round of amusement, summer follows with a different train, and then autumn brings its own. The well regulated mind observes this order, with no wish to infringe upon the rule or to confound the distinction. Unquestionably the sports of some nations widely separated in temperature and position have a strong family resemblance, as in the Scotch game of golf and the Oriental game of polo; and there are others which seem to fit themselves to all climates, like the migrating birds, which thrive under the tropics or on the crags of Labrador. Yet the temperature and season are a fit measure, to a considerable degree, of the fitness of the amusement.

4. *Place and habit of life* make another ground of difference among recreations. There are the sports of the city and of the country, sports of rude life and of refined life, sports of class as well as age and sex. The sports which belong to London in England would not be congenial to London in Canada. The brilliant delights of Paris in France, where night is turned into day, would not be the social cheer of Paris in Maine, where they go to bed in the early evening, or find their pleasure in spelling-matches in place of the "cafés chantants." Rome in New York has probably not yet adopted the profane amusement of Rome in Italy. A uniform standard cannot be fixed for the recreations of the backwoods and of the metropolis, and the lumberman must woo sleep with other visions than those of a Detroit ballroom. There is a fitness of

custom to recreation which cannot be disregarded. The power of adaptation to the habits of the country, in this matter of amusement, is a rare and valuable gift for those who travel, and it is an important art to conceal the disgust which these different kinds of sport excite. The dancing of the western nations is quite unlike the dancing of the eastern nations, and those who enjoy the one are annoyed by the ways and movements of the other. Before commending or condemning any sport, we have to consider its relation to the methods of life in the place where it is found. The horror at the European way of keeping Sunday is greatly mitigated when we consider that it is the regular holiday, to be kept as the traditional holiday, and that church-going is only one of its ideas. The Frenchman, the German, the Italian, the Greek, see no such profanation in the way they take their pleasure on the Lord's day. They have never learned to regard it only as an extreme form of the Jewish Sabbath.

5. Another, and a very frequent way of dividing between recreations is by the phrase "*In-door*" and "*Out of door*." Expressive as this seems to be, it is by no means as sure as the other divisions we have noticed, and is really very inaccurate. For of the sports that would be classed as "*In-door*," many can be enjoyed in the open air; and of the out of door sports, many are most safely used under cover. Still, though the two kinds closely intermingle, there is a distinction which we recognize in the case of many of the more noted sports. All kinds of racing and chasing, of hunting and running, must be done out of doors. Field sports are a very distinct class from drawing-room sports. We have parlor croquet, and table ninepins; but there is no running with the hounds on the parlor floor, and there is no playing of cricket upon the table. And many persons look down upon in-door amusements as a contemptible variety, hardly worthy of the name, hardly fit to be classed with manly sports. A cricketer has no envy of one whose walk is only round a billiard board. Yet, in spite of this contempt, a very large proportion of the joy of society and of individuals, is found in these despised in-door sports, which give pleasure to millions who are wholly hindered from sports of the other variety, and have, on the whole, much more convenience, are cheaper and are safer than sports of the outdoor kind.

6. Another division of recreations is suggested by the faculties brought into use, whether muscle or nerve, whether of the hand or the brain, of the body or the mind. There are some sports which are physical, others which are mental. A game of football is exercise of the body, a game of chess is exercise of the brain. In not a few cases both body and mind are exercised together, and indeed in most muscular exercise the brain has also its share; though there may be brain recreations in which muscle has little or nothing to do. In the close interaction of mental and physical force, in their practical fusion, it is difficult to separate active and sedentary amusements. What acts upon one part of our duplex and complex being, acts upon the other. Muscular pleasure acts upon the mind not less surely than the amusement applied directly to the mind, and the reverse of this rule holds to some extent. As a sanitary agent, mental relaxation is quite as real as bodily relaxation. For good or for evil, the sight of a drama or a spectacle of the street, is as powerful upon the physical system as upon mental perceptions. One who looks on upon a pageant from the window gets the benefit of the movement in his nerves and veins quite as much as one who walks in the procession. Sitting still is more genuine *exercise*, in the hygienic sense of that word, than walking or running, when the body is already fatigued. And the apparent paradox is true, that absolute rest is sometimes the best exhilara-

tion. Sleep is often the best of all bodily recreations, and there is no sport so delightful as the drowsiness which steals upon the eyelids, and the blessed oblivion which annihilates the world, its joys and its cares at once. Nay, sleep and physical exercise often come close together, as when the infant is rocked in the cradle, or the sailor is rocked in the cradle of the deep. There are some who become excessively sleepy from riding on the back of a camel, whose motion is a perpetual rocking and shaking to the bones of the rider. The combination and mingling of brain pleasure and hand pleasure only gives to recreation more zest and value.

7. *Nationality*, again, is a ground of division among sports, an artificial division, but none the less real for that. There are some amusements which suit well the people of one nation, but are not acceptable to the people of another, independently of the difference of climate, or of temperament. In Spain, for instance, the bull-fight is the national sport. That is the recreation of the people, high and low, old and young; and no other nation has that sport or can ever tolerate it. It would be utterly impossible to inaugurate that sport in Paris, or London, or Boston. Even the countenance of the leaders of fashion could not make it popular. Base ball is called the national game of America, as cricket is the national game of England; and thus far the attempts to plant these games on foreign soil have not been successful. The Carnival is the national sport of the Italian cities and especially of Rome. An American Carnival is only a ludicrous absurdity, however painstaking the imitation may seem to be. Sports grow out of the national spirit, and they characterize the national spirit; and a trained eye can recognize the shades of difference in the methods of different peoples in their sports. I heard a western pioneer say that one could tell the difference between scalps taken by the Sioux and the Sac Indians. In the one case, the scalp lock was larger than in the other. And it was once said of the matches between boys in Boston and Charlestown adjoining, that the boys of one town threw their stones with the left hand while those of the other threw their stones with the right hand. If we may take drinking as a form of recreation, national taste here rules, for the beverages are national. There is hardly a nation which has not this mark to distinguish it. The Mexicans have their pulque, and the Syrians their arrackee, which mark them as distinctly as their costumes and their dialect.

8. Recreations are separated, once more, by their *morality* and *decency*. Some are rude, boisterous, violent; while others are refined, graceful, chaste, and dignified. There are some recreations which are perfectly proper for pure and sensitive persons to take part in, while others are repulsive to the sense of decency, and wound all fine sensibilities. There are some amusements which the sexes cannot join in together, to which a brother would not ask a sister. If all amusements to which morality has objection were stricken out of the list, the list would be much shorter than it is. There is a considerable class of sports to which those who enjoy them are not altogether morally reconciled, of which they are half ashamed, and which they do not attempt absolutely to defend. Yet among these immoral recreations are those which are popular and fashionable. The game of *poker*, for instance, which an American ambassador made a special study, amusing and popular as it is, is not a game in which experts make very loud boast. It may be good to drive away melancholy, but is not quite decent in good society.

The mention of all these grounds of discrimination among amusements shows how difficult is any exact classification. No rule can be uniform for all classes.

There can be no revised and finished scheme of recreation anywhere. New varieties are continually brought forward, and the inventors of new games are as well employed as the inventors of new machines. Every year brings out more sports to vary the pleasure of the house or the field. And time carries away some amusements which were once in great favor. The games of the last generation are largely forgotten in this generation, and rarely now do blind-man's-buff, and sports of that kind, enliven the domestic merrymakings. In stationary nations the games are stationary, too; but in progressive nations, the games have to meet the general law.

Can we make any general definition of good recreation in its bearing on health, which shall cover particular kinds and varieties? Perhaps as good a concise statement as can be made is, that the best recreation is that which gives the most exhilaration to mind and body, with most economy of time and strength, and with the least danger to life and limb. Stimulus, concentration, safety, these are the criteria of good recreations. And with this general formula we are prepared to consider those particular kinds of amusement which hold their place, and are acknowledged as the material and source through which health comes to the community. The amusements of society are not so numerous as its occupations. There are more kinds of work than there are of play. Yet there are many more amusements than we might at first think, amusements both of in-door and outdoor life.

1. The most important of all the recreations, used by the largest number, the cheapest, the most natural, the safest and the most effective, is the amusement of *walking*. By general confession, this is the best of all varieties of exercise. It may not meet all needs, but it meets more varieties of need than anything else. In fact, there is hardly any ill that flesh is heir to, hardly any kind of disease, which may not be prevented or cured, if taken in time, by persistent and regular walking in the open air. No panacea is so sure. There are fewer risks, too, in this than in other kinds of exercise. Limbs are in less danger from accidents, and it is less probable that any physical organ will be unduly stimulated. Walking has so much share in the works and cares of life, that it may seem unsuitable to speak of it as recreation. But it is better when it is viewed as pleasure rather than viewed as duty. Conscientious walking has its value, and it is not true that walking for the sake of the exercise is useless and ineffectual. It is more effective when it is not felt to be work, but as work it is a great deal better than nothing. But the more it is felt to be pleasure, and the hygienic purpose is kept out of sight, the more effective it is. There is no keener pleasure than a swift walk with an agreeable companion, in elastic air, and with pleasant scenery to look upon. Walking involves much more than the mere stretching of the muscles, and movement of the limbs. It gives a rhythmical harmony to all parts of the system, and the mind feels it as much as the body. It is a social amusement, and one that is best enjoyed in company with others. And it is good for all ages and classes. One makes a poor confession when he boasts that he does not need to walk, because he has horses to carry him. There is danger to the health of any community, when men and women have to use the muscles of animals to supply the place of their own starved and flabby muscles. The multiplication of horse cars in our cities is by no means an unalloyed good, and does quite as much harm in destroying strength as it does good in saving from fatigue and exposure. It is bad that any convenience should discredit what is so exciting and spontaneous as the amusement of walking, or that fashion should set a ban

upon this. No folly of fashion can be more preposterous than the folly that will call a carriage to take home from the concert or the lecture those, who have been sitting all the evening in a close room or in a constrained position, and now need just the stimulus that a good walk would give them. In fact the walk to and from places of amusement is really in many cases more valuable than the play itself, more invigorating, a more genuine spiritual tonic.

And yet this salutary and natural form of exercise is liable to abuse. These matches against time and premiums upon excessive walking are worse than foolish. Such performances as those of Elwood the pedestrian, and Bertha von Hillern, are condemned by good sense as pernicious and dangerous. Walking which involves excessive strain of the physical organs, loss of sleep, irregularity of appetite, anxiety and distress, which is simply rapid and monotonous plodding around a fixed circle, or up and down in a room, is an injury much more than a benefit. The effort to walk a thousand miles in a thousand consecutive hours, or to walk 100 miles in 26 hours, and all such performances are to the last degree foolish, however they may show endurance and resolution. They are the worst perversion of a good thing. This passion for long and fast walking defeats the best purpose of the exercise. There is a healthy limit here, both in speed and in distance. "Too fast and too far" may indicate a danger which offsets all the gain of this amusement.

2. *Running* is an amusement not very common with adult men in our time and land. The Greeks and Romans had it in their arena, and the red Indians practised it from infancy. It is the irrepressible habit of childhood, and is characteristic of the young of all animals. It is to be regretted that the power of safe running is so easily impaired for the human race, and that so few have the power to resist this strain upon heart and lungs. Why should restless children, active as swallows upon the wing, so soon grow into rotund citizens, whose tread must always be sedate and measured? But few, even of the students of our colleges, emulate the crowning grace of Homer's hero. And there is little hope that this ancient delight will come again into favor. Comparatively few at the "cattle shows," enter as contestants in the foot races.

3. *Riding on horseback* is an amusement which does not lose its charm by familiarity. Those who enjoy it most are usually those who have practised it longest. As a hygienic remedy it has some very great benefits and some disadvantages along with these. It adjusts admirably important physical functions, and reaches hepatic disorders more effectually perhaps than any kind of exercise. It cheers up the spirits and dispels morbid sensations, gives a sense of power, opens the chest to fresher breath, and enlarges the capacity for breathing. But on the other hand there is serious risk in this exercise. There is risk in trusting one's limbs to the care of another animal, however docile, sure-footed or sound that animal may be. A sudden fright, the contagion of excitement, many kinds of accident may make this wholesome sport a danger and a menace. The imagined control of the rider may be delusive. Especially for women, in the position which social decency requires of them, and with the dress which they are compelled to wear, is there great risk in equestrian exercise; and some physicians maintain that more diseases come upon women from horseback riding than are cured by that process, that more functions suffer harm than are adjusted. Hæmorrhoidal tumors are one of the most frequent of the penalties of this joy, and disease of the spine is caused by the unnatural posture which has to be taken. As between the general good and evil of this exercise, there is not much to choose. Adding to the obvious dangers, the

unsuitable hours at which the exercise is taken, on an empty stomach before breakfast, the excessive heat and violent perspiration generated, and there is hardly a balance on the side of good from the exercise.

4. Kindred to this is the amusement of *driving*, which also has its good and bad sides. It has some of the same risks as riding, while it has much less of physical excitement. There is very little good physical exercise in being drawn over a smooth road in a luxurious carriage hung upon yielding springs, and upholstered with soft cushions. There is the fresh air, and the breeze in some directions. But when driving is felt as a luxury, it has much less hygienic value. The cart without springs is undoubtedly healthier, though it may bring more torment than joy. And carriages of all kinds are liable to be overturned, to break down, or to be dashed to pieces. There is no recreation more precarious than that of racing with horses, whether on the highway or on the race course. The great danger here comes from the fact that the principal joy comes in the speed of the movement. Slow driving is tedious and annoying. If we cannot go rapidly we would rather walk. Fast driving is the passion, more or less, of those who love driving at all. And many sympathize with the clergyman, who said that he drove fast to illustrate his advice not to waste time; he thought it as great a sin to waste time upon the road as to waste it in the house, or anywhere else. It may be that driving prolongs life, as it compels men to be more in the open air; it is said that Vanderbilt attributed his vigorous constitution to this source. But as matter of fact, horse jockeys are not usually long-lived men, more than musicians or miners. Not only are they exposed to fatal accidents, but they suffer from pulmonary complaints, the results of exposure and of recklessness. They are more likely not to live out half of their days than to die at a good old age.

5. *Swimming* is another amusement of great hygienic importance, fascinating to those who are expert in it. Man is not an amphibious animal, and the civilized infant, if we may use such a term, unlike the young of other animals, does not swim naturally, and has to be taught, often with infinite pains and difficulty. But the infants of many savage races take to the water almost as readily as ducks, and need no training in this art. Of course, this recreation can only be for a small part of the year and at a particular season, nor is it a recreation which all enjoy. But the most who practise it are passionately fond of it. It is an exercise at once of exhilaration and of cleanliness, acting upon the skin and upon the nerves, and giving a sense of strength and of purification. Yet it has its dangers, which with many seem to nullify its value. Some conscientious and careful fathers will not allow their children to learn to swim. The risk of cramp and drowning, of taking cold in coming from the bath, outweighs all the good of the purification and invigoration. The loss of life every year from this recreation is quite considerable, and, if the statistics were gathered into a mass, would seem almost frightful. And there is great liability to excess in this kind of sport. Not a few of those who were accustomed to bathe in the surf at Newport have given up the practice altogether, feeling that it rather weakens than braces their bodies; and some who own villas in that charming watering place, and have the beach convenient at hand, never once go into the water in the whole season, and say that they feel all the better for omitting the bathing. The cool air bath, loaded with mists and exhalations from the sea, is quite enough to satisfy them. Swimming is an amusement which to be healthy and safe must be guarded by very sharp restriction, and be confined to special places. The water cure, in any kind, is a questionable blessing, and

not to be commended as a universal or an infallible remedy. There are syrens in the deep, even when everything seems safe upon the surface, whose insidious charm is more fatal than the jaws of the sharks. And those most careful of their health may become victims of these spirits of the deep.

6. The amusement of *skating* is the counterpart of swimming. Like that, it can only be enjoyed at a particular season, and for a small part of the year. In Holland and in some other northern lands, it is recognized as an approved form of locomotion; journeys are made upon skates, and time is so economized. As an invigorating sport it can hardly be surpassed. Yet there are serious objections to it when carried to excess, as it is apt to be. There are dangerous reactions in a sport so violent. Limbs are in peril from fall and fracture. The binding cords around the feet hinder proper circulation of the blood; and the best physicians discourage the sport for women, as injurious to the pelvis, and the reproductive organs. The favor for the amusement which was so strong some twenty years ago, has been very largely withdrawn, and the skating rink is much less a place of resort than it was. Yet for young men who have no tendency to organic disease, this form of amusement is one of the best, and undoubtedly helps to lay in a stock of health and strength in the winter months. The roller variety of skating has not so genuine a charm, and is attended with nearly as many risks, and it is not likely to come into very general use. It has no advantage over walking, in any hygienic respect.

7. *Ball playing*, in its various forms, is a sport which does not seem to become tiresome or to wear out in favor. Almost all the nations have it in one kind or another. Children enjoy it, and men enjoy it, and even school-girls find delight in throwing the ball from hand to hand. It captivates the college student as much as the bashful rustic. Indeed, skill in ball playing is now as much credit to a student as skill in Greek or mathematics, and the University is as proud of her pitchers and her catchers as of her first scholars. New forms of this amusement are continually introduced, and the rules of each variety are drawn up in more exact system. Yet this ball exercise, in any form, is not absolutely safe. The bat is a dangerous weapon in the hands of a bungler, and its blow not unfrequently falls in the wrong place. Dislocated joints, wounded hands, eyes blackened, and teeth knocked out, are the signs of zeal in these contests, as much the scars of the duel on the face of a German. If ball exercise brings suppleness to the limbs and agility to the system, it leaves also deformities, which sometimes are lifelong, suppleness dearly purchased at the cost of these deformities. And in some of the foreign varieties of the sport which have been introduced, there are other risks. Ball play on horse-back, which is the plain English of the chivalric game of Polo, has the excitement of a steeple chase, in addition to the hard knocks and disasters incident to ordinary ball playing. Torn clothes are not the worst penalty that one has to pay in the rush and jostle of the foot-ball match; and the blue stockings become red as the runners are struck by the flying missiles. Yet making due allowance for the accidents and disasters, the hygienic value of these ball sports is certainly high, and the good in the saving of doctor's bills, and the prevention of chronic maladies is real and unquestionable. The manly sport of cricket has done a great deal for the physical vigor of the English race, and the racing and chasing in the game of golf have done much to eradicate the evil in the perfervid temper of the canny Scot, and to offset the bad influence of his favorite beverage.

8. The name of *sportsman* is technically and specially given to one who

shoots with gun or rifle, and whose sport is found in the destruction of the life of animals or of birds. To object to this destruction is treated only as squeamish sentimentality. And many scorn all idea that any wrong is done in destroying these inferior lives. A grand day's sport comes when the tale of death is long, and when the "bag" is full. This kind of recreation is counted as the manliest, the most in harmony with man's divine prerogative. Most boys get a sense of new importance and feel that they are men, when the wished for gun is given to them. And it is undeniable that some important spiritual faculties come into this sport as into no other, patience, endurance, discipline to eye and ear; that while the sport is destructive enough, it is instructive too. Many a naturalist got the direction of his taste and his knowledge from his training as a sportsman. Such recreation, certainly, will hardly make men kind, humane, and tender-hearted. Yet it has scientific, not less than hygienic, value. And it makes the material for the army when men are called into the service of their country. It trains men for patriotic duties. Yet this sport will hardly meet the test of safety to life and limb. The enthusiastic sportsman takes many needless risks, exposes himself to the peril of long tramps in unwholesome regions, to loss of food at his regular hours, to hunger and fasting, and wet feet, and excessive fatigue, beside the treacherous dealing of villainous saltpetre. His gun may burst, or may go off too hastily. He may have to fight with the animals which he wounds before he can capture them. Sooner or later, however fortunate he may be, the persistent sportsman is sure to come to grief. The old distich ran "And he that will a gunning go, will surely die a beggar." He is very likely to die by a sudden and untimely death. Not much will be lost, if moral considerations can set a ban upon this fascinating sport.

Some of the objections to this sport of hunting apply equally to the sport of *fishing*. It inflicts pain; it destroys life; and it involves serious exposure, fatigue, hunger, and discomfort. Yet the disciple of Isaac Walton gets a great deal of genuine pleasure, and his conscience is usually easy as to any moral wrong that he does. The risks which he takes are comparatively few. And in spite of wet and dirt, and tramping through slime and swamps and marshes, of leaky boats, and other annoyances, the exercise of fishing is undoubtedly healthful, good for both mind and body. The angler grows stronger and his diseases disappear. This fact was recognized by Oppian in his treatise written more than 1,000 years ago. Fishing is sometimes treated as a religious sport, when it is remembered that the first disciples of Jesus were fishermen; but this can hardly be made a rule or a sign, as in their case it was rather an occupation than a recreation, a source of livelihood rather than of delight, of toil all the night rather than of pleasure all the day, and was pursued in the business way of the net, and not in the fastidious pleasure of the hook and line. But it has been maintained that Jesus preferred fishermen for his Apostles because they were more likely to be robust men physically and fit for the service to which he called them. And it is a remarkable fact that not one of these Apostles seems ever to have been upon the sick list, or to have been disabled by malady from active service. Peter's wife's mother had a fever, but not Peter, or Andrew, or James or John, so far as the narrative tells us. There must have been a charm about the occupation when they could go back to it so readily. For after the Master had left them, Peter said to John, "I go a fishing," and they kept on in it, night after night. There is no record that they were huntsmen or had any interest in hunting, whether with dogs or leopards.

9. If much noise, and large expenditure of time, money, and feeling, are a criterion of value, no recreation of our time can be compared with that of *rowing*. The chief end of a University education, in many cases, seems to be the knowledge of this art. The boat club is the child of this generation. No sport has ever become so popular in so short a time. To gain fame and skill in this exercise, all sorts of self-denial will be submitted to, men will keep a perpetual Lent and deny themselves their most cherished delights. Indulged in moderately, there can be no doubt that this is one of the best of physical exercises, enlarging the chests, strengthening the lungs, knitting the muscles, and sending a healthy vigor through the whole body, an exercise as good for women as it is for men. But emulation and overstraining may make it very dangerous. It is a hazardous amusement, when it taxes the muscles and lungs severely, and lays the foundation for phthisis and functional disorder. It is a fact that many of the heroes of the oar have fallen victims to pulmonary maladies, the seeds of which were sown in their seasons of triumph. To make this exercise safe and healthful, it should be kept strictly within bound, and never degenerate into a trial of strength or a trial of speed. The weight of the oar should be proportioned to the size of the oarsman. It is a poor ambition to get notoriety in the work of the galley slave. With this proviso, rowing can be commended as one of the most salutary of the forms of physical exercise. It is cheaper than riding on horseback and much safer. The keeping of the boat costs very little, and the chance of upsetting is small when one has learned the art of management. It is foolish to set rowing above study in considering the work of Colleges, but boat clubs are to be commended as combining in a rare degree health with pleasure.

10. There is another variety of aquatic sport, to be classed among luxuries, of which very few can avail themselves, *Yachting*. As usually pursued, this has about the same value as driving in a carriage upon soft cushions. It is an aristocratic sport, and involves great waste of time, extravagant expense, mad emulation, and some dangers. It is not every yachtsman who knows when it is safe to trust his vessel to the boisterous wind or to the angry sea. There are very few ways in which so much money can be spent upon pleasure with so little sanitary gain. The sight of a yacht regatta, indeed, with its fleet of white sails and streamers flying, is beautiful to see, and very exciting. But except as it gives good air to breathe, and a glow to the spirits, yachting has not as much hygienic value as riding on a rough road, or a brisk walk; and not much need be said of it, as with all but a few it is out of the question.

11. After these, the primary purpose of which is sport and pleasure, come another class of recreations which are primarily sanitary contrivances, and only incidentally amusements, the various appliances for securing health, which are advertised as such, whose name is coming to be *legion*. *Gymnastic conveniences*, of all sorts, sizes, and materials, bulky and compact, horses for leaping, parallel bars, ropes, loose and tight, trapezes, ladders for the hands, and fixtures too numerous to mention. For a long time weights in the form of dumb bells, were the approved instruments, of iron, of lead, even of wood and stone, and the amusement prescribed was to swing these for one-half an hour or an hour in the day. The fault of these contrivances, as of most gymnastic contrivances, was that after a time the exercise became monotonous, and fatiguing to soul and body. The pleasure became only a painful task, from which all the excitement dropped out. In place of these we have now lifting for health, machines in which there is the excitement of increasing strength, as the weights

are lifted in a progressive series; and the newspapers are crowded with certificates from clergymen, teachers, lawyers, men of sedentary habits, as to the magical virtue of this or that Health Lift, the relief from all maladies, the quintessence of all remedies, driving out from the body all its aches, and from the soul all its devils, and concentrating into a few minutes of the day all the exercise that is needed to keep the body and soul in good condition. The principle of all these Health Lifts is the same, and it was urged by the famous Dr. Winship, who beginning as a puny consumptive, transformed his frame to the frame of a Hercules. There is reason in it, and yet a large part of the magic virtue claimed is imagination, and idle vamping. To get the benefit of these Health Lifts very careful precautions are necessary. Disorder of the heart, valvular disease, lameness of the abdominal muscles are quite as likely to come from this handling of heavy weights, as release from lameness and pain. It is doubtful gain, when headache is removed only to break the heart in a literal sense. And these puffs of the machines in the newspapers, and circulars sent out so widely are not to be implicitly believed, but are to be taken with very large allowance. We know of more than one instance where this indispensable source of comfort, after use for a little while, has ceased to perpetuate the joys of Elysium, and has been consigned to the garret, as ponderous lumber, there to rust and gather rust, a painful sign of disappointed hope and misplaced confidence. Some who have certified to their physical regeneration from the Health Lift, are mortified to find that the enemy has been silenced for the time, but not dislodged, and that now again they are victims of dyspepsia, and that the blue devils still haunt them. It is not to be expected that these new methods of bringing a sound mind in a sound body will supersede the old methods, or make a clearing out of the old forms of amusement.

12. *Military Drill* is a recreation which has come into large notice since the recent war, and has been urged upon parents, teachers and school trustees with not very marked success. In discipline of the body, and the formation of mental as well as physical habits, it is valuable. But when anything becomes a part of routine, and is taught as part of a prescribed course, it becomes irksome and disagreeable; and it is safe to say that this has been the result in most of the cases where drill has been introduced. *Drill* is a fatal designation for any kind of amusement. It is *bondage*, and all amusement to be genuine, must be free and not be confined to rule. For some natures military work is attractive. But the drill of the schools after the pupils have got used to it, loses all its charm, and is no better than the drill of the camp. Yet the actual benefit of the exercise is so great, that it is worth while to try all possible arts to make it agreeable, to prevent the play from becoming hard work. A skillful master may keep the charm that flies before the manœuvres of a conceited bungler. It makes all the difference in the world whether the drill be conducted by a West Point captain or a rustic corporal.

13. *Excursion and Travel* are a kind of recreation which cannot be excluded from a complete survey. From the sanitary point of view, no amusement is more beneficial than this. There are many diseases which are warded off by this remedy. Change of scene, new associations, freedom from care, deliverance from routine, these are more effective than nostrums or medical treatment, even with the best medical skill. A journey for a year, or a few months, or weeks, will work wonders in renewing healthy digestion, in restoring languid appetite, and giving a new lease of life to morbid and complaining souls. Recreation of this kind is literally *recreation*. Soul and body are made over

again, and the man comes out as good as new. There are occasional instances of persons who have never gone away from their homes, but have stayed year after year in the same place with no change of scene, and yet have kept physical health, are never sick, and have no occasion to ask the advice of a doctor. But such instances are very rare, are not numerous enough to make the example safe or wise. Even the healthiest locality is not so good as an occasional or frequent change of scene, and the body and mind are more likely to be sound in movement and in new impressions, even if some of the experience is in insalubrious places. There is great benefit even in the confinement of a sea voyage, in which the only walk can be of the promenade on the deck; and the seasickness which goes with it, in most cases of those who suffer, is an advantage rather than a harm in the end.

14. The recreations of which we have thus far spoken would be classed as outdoor recreations, though some of them are enjoyed under cover. They are mostly muscular amusements. But quite as important as these, in their charm and their excitement, is the large variety of amusements of indoor life, some of which belong to the kinds of which we have spoken. The sports of the billiard room and the ninepin alley, are properly varieties of the ball game, but they are free from the objections to which the outdoor games are liable. There is a prejudice against them in some minds from the fact that they are associated with gambling and dissipation. But there is no necessary connection between these vices and the sport itself. Where there is room in the house, it is good economy and good sense to add a billiard table to the furniture,—much more reasonable there than useless chairs and knick-knacks which have no meaning and are not even beautiful. There is no game which concentrates more valuable exercises than this, for the limbs, for the hand, for the eye, for the brain, which stimulates so much while it fatigues so little. It is a game which intelligent physicians commend, and which preachers ought to commend, instead of leaving it to corrupt and wicked men, who tempt the young to their destruction. The billiard table in a well ordered house is the best auxiliary to the library, and is properly honored in some houses by being set in the vestibule, the first sign of a healthy hospitality to the entering guest.

15. Of proper in-door recreation, the most favored, and probably the most beneficial in hygienic value, is music, in its different kinds, of singing and playing upon instruments. There are wise physicians indeed, who deprecate the over enthusiasm for this art, who insist that the lungs and throat are injured by undue straining of the voice, that health is blown away by much devotion to the horn, that the lips are injured by the mouth-piece of the clarinet and bugle, while the fingers are hardened by the strings of the harp or viol. Yet the moderate use of the voice in singing, in rooms properly heated and ventilated, unquestionably strengthens the lungs instead of weakening them. Music more than anything transforms work into play, and makes a joy of what were else a burden. It drives away fatigue. The negro who whistles as he is sawing wood, knows this. The chimney-sweep knows this. All sailors know this. They have to sing together if they would haul the bowline with any success. The Nile boatmen when they ply their heavy oars, need the chant of the Nagadil horses to keep their arms vigorous, and when they tow the boat upon the shore must have their refrain of "Allah Mohammed" to keep up their spirits and enable them to resist the burning sun. Music is a common ground on which pleasure and hygiene happily come together, and for which the church has only an encouraging word. Other things being equal, a

musical community will be a healthy community. And it is a great mistake to suppose that the large amount of money spent in the cultivation of this art, is wasted. The musical races of the world are the healthiest, savage or civilized. A "robust tenor" is not merely a technical name, but is the statement of a physical fact. Singing will make men robust, and it offsets the evil effects of bad air and unwholesome diet. Nightingale's tongues are dainty food, but these only symbolize the exquisite satisfaction which comes in the concord of sweet sounds. The more music we can have the better. And it is one of the happy signs of our time that the piano, once only the rare luxury of the rich, too precious for a rude touch, has now become the very commonest of household necessities; that it goes everywhere, into the cottage of the laborer, into the hut of the backwoodsman, as well as into the high-ceiled house of the cities; that the humblest workman may now enjoy what the queen, two centuries ago, could hardly buy; that even the wild Indian may be subdued into quiet and decency as he listens to these sounding strings. With music recreation is not far to seek. And it anticipates what is most confidently promised as the joy of the future heaven.

16. A recreation closely joined to this historically, but by no means in such universal favor, is the recreation of dancing. The fact that it is Scriptural and very ancient, being painted on the walls of tombs, and sculptured on the classic monuments, has not prevailed to dispel the Puritan prejudice against it. But if the amusement be irreligious as some think, it is exceedingly fascinating to the young, and many never outgrow their love for it. It is a sport at once democratic and aristocratic. Court balls are the highest grandeur of royalty, and there are balls of the people in almost all the nations. As to the hygienic value of this amusement, opinions widely differ. No one can dispute that it cheers and exhilarates, and that if it were enjoyed in proper places and at proper times there would be no harm in it. It is a beautiful sport, and "the poetry of motion" is not an idle form of words. But it goes so often with insufficient dress, with late hours at night, with excessive perspiration and physical exertion, with irregular and indigestible food, that it is quite as often dangerous to health as refreshing and salutary. It is one of those amusements which will hold their place against all denunciation and ban; and it is the part of wisdom to regulate rather than prohibit it, to separate it from the abuses which have no necessary connection with it. The ballroom may be a gate of perdition, as it invites to turn night into day, and murders sleep, and stifles the lungs with unwholesome air; but these abuses do not belong to the amusement by any necessity. Terpsichore was as worthy a member of the glorious nine as Polyhymnia. The sport of dancing only reduces to grace and order the motion which is natural and spontaneous. Of course, to give warrant to this amusement it must be kept within the bound of decency. But in itself there is no reason why the measured movement of the winding dance should not be as healthful as rude running upon the lawn, or chasing the ball according to the rules of the game. This amusement, moreover, has the merit of bringing the sexes together, and imparting the magnetism of each.

17. Not much can be said of those sedentary amusements, which are the resort of so many to hinder ennui, and make time pass pleasantly. Chess may be a superior mental discipline, but rightly regarded this game is hard intellectual work, though it is called play. It is only a false use of words which calls a sport which taxes so severely the powers of thought and attention a "game." This is not the best exercise, either for the wearied mind or body.

Nor is any game such which tries the brain severely. The games of cards are less trying to the brain. But it is difficult to see that these have any sanitary value except as distractions. Other things being equal, there is no gain to body or mind in the excitement of the rubber of whist, agreeable as it may be at the time. The good is all in the social element which it brings out. And when the gambling spirit is excited, the result is positively evil, in disordered brain as well as disordered conscience. Card playing brings not a few to insanity, if the testimony of experts may be trusted. And softening of the brain is penalty of an inveterate passion for this sport. The wrecks of college life are as often traceable to this sport as to overstudy. And it is a mistake to suppose that the fountain of youth is found at the card-table and that senility is kept back by devotion to this amusement.

But we need go no farther in specifying and considering separate kinds of recreation. There are many more than those which have been mentioned. And women have some recreations which they characterize by the equivocal name of "*work*," work with the needle and embroideries.

Before we leave the subject, there are some general remarks to be made and counsels to be given.

1. All public institutions should have conveniences provided for recreation as much as for work. No school building is properly placed, which does not have an ample play ground attached to it, with room for the freest relaxation. This is just as necessary for a school building in the city as for a school building in the country, and the excuse that land in the city is too costly to be used in this manner is simply disgraceful. It is bad enough to herd children together in huge brick receptacles of three, four and five stories in height, often without ventilation, but the evil is intensified where there is no space around the building for relief from this confinement. We might say, too, that every college should have its gymnasium, with suitable apparatus, proportioned to the size of the institution and the number of its students. The gymnasium is as important as the recitation-room. In Germany, gymnasium is the name of the preparatory school, such as our Colleges or Universities actually are.

2. And in the order of school work, there should be sufficient allowance for relaxation. The "*recesses*" should be numerous enough, long enough, and lax enough, to give relief to both mind and body. A "*recess*" which is hampered by many rules and restrictions loses half its value. As far as possible, the pupils should forget restraint in their time of play.

3. Other things being equal, recreations should be of a kind in which there is least risk of bodily injury, in which there is least violence, in which the fatigue is less, and the strain upon any part is not excessive. That violent sports are popular, and carry the crowd with them, is no reason for tolerating or glorifying them.

4. Other things being equal, too, those sports are best which are most free from passions, in which anger and envy and hatred are not aroused, and which are free from the reality or the appearance of brutality. Boxing, wrestling, fencing, with all their ancient fame, cannot be highly commended in their tendency to arouse the spirit of fight, however free from personal antipathy they may seem to be. Any sport which disturbs the normal balance of the healthy soul, is hygienically bad. All the symmetrical physical development which comes in the sports of the arena will not compensate the evils to temper and to nervous symmetry which these sports foster. Gladiatorial matches have no claim to come into pure and innocent recreations. There is the same objection

to pigeon shooting and to turkey shooting that there is to bull fights and cock fights and dog fights. They are cruel and they tend to harden the heart, and so to deprave the man.

5. Other things being equal, again, that recreation is best which exercises the largest number of faculties, spiritual as well as physical, which has the greatest variety of movement, and the most thrilling enjoyment. The pretence of any kind of exercise that it brings into action every muscle in the body is preposterous. But some kinds bring many more muscles into action than others. It is not necessary that every muscle in the body should be used, in order to keep health and strength. There are some muscles which we can disregard. There is no reason why a man should wish to move his ears, or why he should roll his eyes half out of their orbits, as Booth in acting Richard III., or why he should throw his joints out of their articulation, like the devotees of the Turkish bath, or why he should make a hoop of his body like a Japanese acrobat. The laws of health do not require men to writhe and twist themselves like serpents, or to imitate the antics of the Vokes family. The play of the body is best when it exercises those muscles which are brought into use in work and in the ordinary needs of life. There is no need that one who has to walk a good deal in his work, or stand at his machine, should take his exercise in running up and down ladders or standing upon his head. Eccentric exercise is less health-giving than exercise conformed to the general habits of life. The fact that some faculties but little used are brought out in such an exercise does not make walking on the tight rope a praiseworthy sport, or relieve it of foolhardiness.

6. And it is necessary to say that exercise should not be continued when one is tired, whether in bodily or in spiritual fatigue. While it is well to devote regular time every day, so many minutes or hours at least, to recreation, it is not well to have an unvarying rule, which disregards all hindrances and emergencies. The forcing of recreation is anything but wise. When the system needs rest, it is bad to give it stimulant. A forced laugh is the most melancholy of pleasures. We have to consider that rest and exercise are not equivalents, and that amusement is not always repose. It is a mistaken consistency which will walk so many miles every day, no matter what the weather may be, or in what condition the body is, or will rush to an exciting drama, when the mind is all tired out. In the great Philadelphia Exhibition there was quite as much weariness to the flesh as there was joy to the spirit, and in not a few cases, the high wrought pleasure had a fatal termination.

7. Recreation is not less necessary where work is easy than where work is hard. An artist needs it as much as a mechanic, the clerk in a city warehouse as much as a college student. He is a cruel master who lets his apprentices have no vacation, but confines them to the leisure which they get in the store, when business is not brisk. No matter what the work, sound health in it requires an occasional change of scene. One may sing that there is no place like home, and believe it; yet the blessing of home will not come to one who never goes away from home, and never sees any other place. The scheme of healthy life should include, for all the members of the household, parents, children, servants, too, an absence from home, at some time in the year. Light duties are often as wearing as heavy duties.

8. A question not easy to be answered is of the proportion which play should bear to work, what share of time should be given to recreation. Perhaps in the reaction from the old prejudice against all recreation we may go too far,

and allow amusement too large a share in the experience of life. The tendency now is to multiply holidays, to increase the number of days in which idleness is legal and in which men leave their regular toil and occupation. But it is safe to say, that as yet in this land we have not come to the point when holidays have become a danger to health or morals. We fall far behind in this matter most of the civilized nations. Our Sunday has not as yet become a playday, as it is in most of the countries of Europe. Saints' days, even those which have an ecclesiastical origin, are not much observed, and the national holidays can be counted upon the fingers. Except the Sundays, half a dozen days in the year include about all the special days of festivity and leisure. As a rule, our people work too hard, and do not give themselves the relaxation which they ought to give. The loungers are always numerous, indeed, and there is a large proportion whose habit proves the theory that man is naturally a lazy animal. But taking the community as a whole, we suffer more from over production than from slack production, and the supply of labor and its product are more than equal to the demand. There are more who break down in health and strength from too constant work, too steady confinement, than who lose force from lazy indulgence. The brain and the hand are both overworked. It is a fault of our system of education that it is worked at high pressure. The children in the schools are required to do more than they ought, and lose the health which they ought to lay up for the future work of life. More amusement and less brain work, would train a better race of men and women, and it is still a question whether the mischief done by our public school system, with its multiplication of studies, its rigid discipline, its emulation, its mechanism, is not quite equal to its benefit; whether the noblest vigor of human life is not lost in all these restraints and contrivances. Perhaps the statistics may not prove that mortality is not greater where school discipline is rigid and school-houses more numerous and tyrannous than where children are left freer. But the impression is inevitable that this forcing and mechanical system cannot be so wholesome as the system where natural inclinations have freer way. A prison may be better ventilated than many city houses are, and prison life may be free from epidemics and fatal maladies. Yet we cannot help the feeling, however well constructed a prison may be, that the kind of life is not a healthy life, and that a prison is not a fit place to live in. All the appliances and precautions cannot make a life which is all penance and no pleasure, wholesome and beautiful. Health and freedom are ideas which we cannot well separate.

Good sense, therefore, will use all the innocent recreations which we have already, and will increase rather than diminish their number. There is a stronger presumption in favor of those which have come to us from ancient date, and have kept their place against hostile influence. *Prima facie* an amusement which has survived the ban of the church, and the warfare of formidable prejudice, and has proved itself pleasant to men of all classes, has vindicated its right to exist.

HEALTHFUL DWELLINGS.

— BY —

HENRY F. LYSTER, A. M., M. D.

MEMBER OF THE

STATE BOARD OF HEALTH,

AND ITS COMMITTEE ON DRAINAGE, SEWERAGE, ETC.

HEALTHFUL DWELLINGS.

BY HENRY F. LYSTER, M. D., DETROIT.

The homes of the people show the elevation in the scale of enlightenment and civilization to which the nation has attained.

There can be no great advancement made, no permanent leadership acquired on the part of any people where the dwelling places are lacking either in comfort or in the surroundings which contribute to the healthful development and well-being of the occupants. These axioms are apparent to every one who has given thought and attention to the history of the gradual progress of the race.

In the World's fair recently lying open like a great volume for the perusal of every one who turned aside from the occupations of every day life, may have been found page after page proving that excellence in living and abundance of material comfort in the homes, go hand in hand with the highest perfection in art, literature, and science, taken in the largest acceptation of the terms.

To enable the people to inform themselves correctly of the present status of each country of the world, were these magazines of usefulness and beauty brought together; and of the many lessons, none was more readily learned than that which pointed out the fact that at an equal pace with a healthful and legitimate advancement in civilization, are the knowledge of sanitary laws and the construction of dwellings, factories, and public buildings in conformity with them.

The rude shelter of the earlier inhabitants of prehistoric times, and the gradual development of domestic architecture, and improvement in the modes by which dwellings have been constructed, have been in keeping with the general condition of the race, and any advancement in these respects has been cotemporaneous with the slow emergence from its primitive condition of barbarism.

The first rude shelter of men depended for its selection or construction upon the simple wants of the savage, as indicated by the climate and natural condition of the country. In one place caves were depended upon, and at another huts made with the branches of trees interwoven with reeds and rushes plastered with mud were used. As the various tribes progressed a step beyond their former state, stones were used cemented with clay, or walls were formed in molds and dried in the sun, and the huts of skins and branches gave place to those composed of timber roughly joined or hewn and mortised together.

These dwellings were located regardless of any other considerations than convenience or protection from the elements, or from natural enemies.

As the different tribes moved from one country to another in obedience to laws of emigration which have influenced the race from the earliest times, and about which we know little, excepting that they were in conformity to the natural wants of those governed by them, the architectural style and design of their habitations was changed to suit the changed conditions of country and climate.

Nations which inhabited the wooded mountainous parts, as they came down upon the plains destitute of forests, formed out of the stone ready at hand, or else out of stiff clay, dwellings in which they reproduced, even in the most minute details, the appearance of the structures in wood. When these tribes moved again, ages subsequently, and again reached wooded country, they abandoned the clay and stone and resumed again the log houses like those of their ancestors.

Reviewing, so far as the limits of this paper will permit, the very interesting subject of the habitations of man, questions naturally arise regarding the salubrity of the locations which have been chosen, upon which cities and dwellings have been built or are now being erected.

In earlier times, when in the possession of but little scientific knowledge, and with less regard for human life, when the avocations by which individuals supported themselves did not permit of their large aggregation into a limited space, with exceptional instances, but little thought was taken as to the salubrity of the ground chosen for either a dwelling or a town. Cities have always occupied particular localities more by accident than design, and this remark applies to many noted for their present rapidly increasing size and importance, as well as to others founded centuries upon centuries ago. Rome has always been unhealthy notwithstanding the introduction of aqueducts and a supply of pure water, and the building of the cloaca maxima, which to-day drains away the sewage as well as it did twenty-four hundred years ago. It was built upon seven hills, and yet with all these excellencies in its favor, they have been to a great extent counteracted by the poisonous emanations from the Pontine marshes and the Campagna. It is noted for its fevers and dysenteries of a malarial and typhoid type.

Berlin, which has so rapidly accumulated a population of seven hundred thousand, and which is growing more rapidly than any other city in Europe, has no natural advantages of situation, and on the contrary is so low and level that engineers have not yet solved the problem of efficient sewerage. Enteric (typhoid) fever prevails here, and should the Asiatic cholera again pursue its westward course through Europe, it would prove a doubly formidable scourge at the Prussian capital. We might mention many other illustrations to show that but little improvement has been made regarding the choice of a healthful site for a city by those living at the present time over those made by the ancients. The peculiar geographical, mercantile, and political relations have always held a much greater influence in determining this point than any question of salubrity. From small beginnings, starting from an oriental inn, or a northern hamlet or fishing port, have the great majority of towns and cities grown. The location sufficiently adapted to a village, has been overreached by the extending town and wide spreading city, until its borders have encroached upon the low suburbs or neighboring bayous which are required to be subsequently graded and filled in after the manner so familiar to most of us.

As society is constituted with us, and as villages, the prospective cities are, for the conveniences of trade, depending entirely upon navigable waters and railroad communication for their location, but little can be done at the outset; and sanitary measures must be limited rather to remedying the natural defects, and in complying with the generally received plans of preventing sickness and death by the introduction of pure water and the removal of effete material, and in the adaptation of the buildings to proper dryness and ventilation, trusting to the gradual and general enlightenment of the people to make in future those plans readily available by the proper selection of sites for new towns so far as can be done in conformity with the laws of commerce.

When we come to the selection of a site for the dwelling itself, the matter is much more generally under the control of the individual, and although in many instances the circumstances controlling the location are so determined by distance from work, or place of business, or neighborhood, that but little opportunity is allowed to exercise the knowledge of hygiene which we possess; on the other hand, in the much larger number of cases, ample scope is permitted for the complete employment of all the wisdom we may possess. If it is to be in the large town or city, the lot may be selected in the most healthful quarter, where there is plenty of pure air, an abundant supply of good water, and perfect facilities for drainage and sewerage. When we have availed ourselves of all these we have accomplished everything.

If the dwelling is to be upon the farm or plantation, we look to the same general objects; as wide a choice is often afforded, so far as extent of territory is concerned, in which to select the favorable site, as there is in the town or city; but here a wider range of accurate knowledge regarding causes which tend to produce disease must be at command, for although the boundaries of the farm determine the limit of choice, yet the location of the dwelling may be selected in any portion of this area.

Here an acquaintance with the character of the contiguous country is of first importance.

The vicinity of low, undrained, or swampy lands and marshes, or of mill-ponds or overflowed lands should be avoided, and the contrary topographical conditions should be sought.

Upon the lower peninsula of this State, the mountains or steep rock walls are not found, and we are not influenced by those extremely obdurate neighbors, as are many of the people of New England, Pennsylvania, Utah, and California. The generally rolling and open face of the country gives a much greater opportunity for choice in this matter of locating the dwelling, and does not drive with us the hard bargain made with many of our eastern and western brethren by the divides of the great continental mountain chains.

We may safely assert that no geological formation offers a better choice than that of the drift period, which covers almost the whole of the settled portion of this State, with its gently undulating hills and valleys with their gradual slopes.

It is not necessary in the selection of the location (we will presume for the sake of elucidating the various truths we are endeavoring to inculcate, that the area is somewhat ample), that we should look for the driest and most porous soil, or the most elevated, or the least accessible or convenient point. We are not necessarily obliged to sacrifice everything to accomplish our laudable purpose to obtain a desirable spot. A clayey soil is just as healthful to build upon as the most porous sandy loam, and, many times, much more so.

People have lived year in and year out upon a clay bank fifty to one hundred

feet in depth, and have not suffered from terrestrial emanations or noxious vapors; while up from the most beautiful and pure white sand have come malarious poisons, which in a single night have in certain seasons permeated the system of the unwary traveller and produced the most virulent fevers and dysenteries.

A gravelly or sandy loam may appear to the superficial examiner dry, and such an excellent disposer of water that traces of the heaviest rains disappear shortly after they have fallen, and yet upon a deeper investigation water may be found a few inches from the surface lying upon a bottom of impermeable clay. A site upon such insecure foundation would, unless it could be remedied by drainage, be most unfortunate.

The near presence, particularly if lying to the side of the prevalent winds, *i. e.*, to the south or west of a pond of stagnant water, as a mill-pond, or of a swamp or marsh, which could not be drained, would render infeasible a place which otherwise might be considered unexceptionable.

The fact that this locality is within a few rods of the corners, even if it is not desirable, will not compensate the family for all the ills that follow in the train of malaria; a perfect Pandora's box they are: agues in the spring, dysentery and fevers in August and September, pleurisy, pneumonia, and consumption in the cold weather.

If human life can be not only prolonged but made much more enjoyable, for the reason that good health is preserved, why should we not regard all these palpable and many of them most palatable truths which come to us by sanitary observances?

There are a few limited situations in which no amount of precaution will prevent the local influences of the surrounding neighborhood from producing certain forms of sickness dependent upon malarial origin. That these are much less frequently met with in this State now than formerly is due to the general settlement of the interior and to the opening up of the country by clearing off the land and especially by ditching and consequent removal of stagnant surface water and relief of wet lands.

The earlier opinion of many that the central portion of this State was to a great extent insusceptible to cultivation, on account of the large amount of wet land, has proved entirely without foundation. The interior is much higher in elevation than the marginal portions of the State, and but a very small acreage is not capable of some kind of management. Malarious fevers are diminishing in frequency year by year, and in no part of the State are characterized by the severity which distinguished them twenty and thirty years since. Yet the influence of malaria is present with us, some years, it is true, more than others, particularly in the latter part of Summer and in the Autumn, and if not shown by more violent symptoms of former years, influences sickness very materially, particularly fevers and dysentery.

In districts which are more or less influenced by malaria, a great deal can be done in the way of locating the dwelling so as to avoid as much as is possible its pernicious influence.

The house should be built upon ground which can be thoroughly under-drained. "Excess of moisture is often rendered visible in the shape of mist or fog particularly toward evening; efficient drainage causes the removal or at least a diminution of such mists, and a proportionable decrease of diseases generated or aggravated by dampness."—Br. B'd Health Reports, 1852.

If the land can be drained, it matters little what the particular kind of soil

may be in the chosen locality. Sandy or loamy soil does not need the same amount of artificial drainage if the underlying subsoil is deep enough to permit the surface water to go down several feet below the top of the ground and then to flow off into lower levels and away into natural conduits, the streams and lakes.

A thick tenacious clay will need, unless the natural slope is well marked, tile drains in the vicinity of the house, to be placed not more than twenty feet apart; whereas in open, porous soil, drains may be constructed at twice that distance with perfect relief to the land of all the surplus water that falls upon it.

Whenever it can be obtained, a fall of between one and one-half and three feet to the hundred should be aimed at.

The cellar should always have a good tile drain leading from it; and this it would be well to connect with one laid around the outside of the foundation of the house, which will not only drain the ground within twenty or thirty feet of the house, but will relieve the wall and prevent the infiltration of water through or under it into the cellar, particularly noticeable during the spring rains.

Nothing is of more importance in the management of the location for the dwelling than that it should be well underdrained.

In the ordinary country farm house, the only drain, except there may possibly be one from the cellar, which will be found, is an open one from the vicinity of the kitchen door to receive the semi-liquid waste from that important laboratory.

This very essential improvement, about the necessity of which every house-keeper will bear me out, should be covered, and should be long enough to carry away the kitchen sewage to a distance of at least seventy-five feet, or twice that distance would be better where it could safely debouche upon the surface, and discharge its contents into the soil or upon earth placed there to receive it, which might subsequently be used as a valuable manure upon the garden.

This drain could be durably made of glazed tile cemented at the joints, or of wood in the style of an ordinary box drain four inches wide and the same in depth. Prof. Kedzie, one of the members of this board, suggests that the box drain be placed upon its edge in order to make it less likely to become obstructed.

The end next the house could be connected with the kitchen sink by lead pipe with a trap, and it could also have an external opening just outside the door for the reception of such material as might be able to go through the perforated colander at the bottom of the hopper. One of the rainwater pipes might be conducted into this drain to flush it at every rain.

The general use of kitchen drains would, we are convinced, diminish sickness in a marked degree; and we have taken the time and space to call particular attention to this, in the estimation of too many, an apparently insignificant affair.

The decomposition of kitchen sewage and wash water from the house, under the windows opening at the rear of the house, is in Summer an important factor in the production of cases of disease, particularly those indicating serious intestinal irritation and inflammation; as diarrhœa, dysentery, and enteric (typhoid) fever.

The ground becomes sour, and saturated with fermenting poisons, rank weeds spring up, and it only needs the steady heat of July and August to cause it to send out the poisonous gases, or ripen the germs of disease, whichever may be

the correct theory, and these readily find their way into the house through the open windows.

These waste materials are often, in fact usually, thrown out in the immediate vicinity of the well, and in heavy rains the soakings run into the well through the curbing or permeable walls.

A well, unless properly made, acts as a drain upon all the subsoil water within thirty to seventy-five feet in every direction, and consequently drains into itself much of the imperfectly filtered material in its vicinity, all of which is detrimental to the quality of the water, which should only come in at the bottom and from a living spring.

The large majority of wells are left open at the top, and with very inefficient curbing; the walls are fissured and cracked, or at least are not water-tight and permit the inflow of water from the ground surrounding it.

The well, in whatever manner it may be built, should be tightly covered at the top and should have its walls laid in cement impermeable to water.

Recently wells have been, in many cases, made of iron pipe of small diameter driven down to the water supply; a pump is then attached to the tubing. This form of pump is adapted to prairie lands, and locations where there is not much stone.

The cheapest and most desirable wells are now constructed by means of a well auger which can bore from twenty-five to fifty feet in a day; the well is lined with glazed tile or pipe cemented at their joints with water lime cement. When the well has been lined, a filter is made by throwing in coarse sand and washed gravel to the depth of fifteen or twenty inches; the top is securely closed with stone laid in cement.

Wells of this class are a great improvement upon those loosely built, as they avoid completely the contamination by soil water, which is a great desideratum. If the water comes from a good depth, and especially if from below a stratum of considerable density, it will remain uninfluenced by the local impurities in the vicinity, such as vaults, and sinks, and cesspools, for a much longer period than will those of ordinary construction.

The supply of pure and wholesome water being one of the most important of all matters pertaining to the welfare of the household, too much attention cannot be given to obtaining it, and to preserving its quality when found.

Much has been written and more said regarding the contamination of water supply by digging too near the well, or above its level, the vault for the reception of human excreta; and it will be in place rather to refer to former reports of the Board for information upon this subject, than to go into details. I may, however, remark, that "where the water-carriage system cannot be applied, and the necessity for a vault is consequently apparent, that it be made water-tight. The free entrance of air should be permitted into vaults of this construction. Ashes or dry earth should frequently be thrown in, and occasionally some chemical disinfectant, as green vitriol (sulphate of iron), dissolved in water. Vaults should be emptied at least once each year."—*Vide* State B'd Health Rept., 1875.

While reviewing the usual measures by which the house can be rendered healthful, we wish to give particular importance to the necessity for the removal of dampness in and about the premises.

Dr. Bowditch, in his report upon the Causes of Consumption (*2d Ann. Rept. Mass. State Board of Health, 1871*), shows that they can in many instances be summed up in three words, viz.: "premises too damp." The same results have been confirmed by others in all parts of the world.

In recent reports made to the British government, under the superintendence of Mr. Simon, the same observations have been made, and remedial measures have been proposed and steps taken looking to the carrying out of plans which will undoubtedly prove of the greatest value, not only to their own people but indirectly to the whole civilized world.

Asiatic cholera, diphtheria, and cerebro-spinal meningitis are, besides those local or endemic disorders already mentioned, more generally found prevailing in low and wet places.

The poison of all epidemic forms of disease is of such a virulent character that it leaps over all ordinary bounds, and shows itself in localities sometimes the most unexceptionable; but when the violence of the onset is over it will be found conforming to the general observation of all diseases, and committing its greatest ravages in the localities ordinarily considered unhealthful.

In order to illustrate the views which have been advanced, we will instance the histories of two or three families as they occur to us at the present writing, believing that they will call to mind similar instances in the experience of very many who may read this paper. A young married couple of good health and strength settled upon the bank of the Connecticut river nearly fifty years ago, and built a house upon the side of a high hill at some distance above its base. The lawn upon which it was erected was not large enough, so the hillside was cut into in order to get room enough for the rear buildings. This side of the hill was walled up to a good height with brick. The sun for a good part of the day was behind the hill, and the air was to a certain extent prevented from moving with as much liberty as it should have had. Small rills of water very constantly trickled from under the brick wall: particularly were these observed passing over the premises in the rainy season and when the snow was melting upon the hill. The general character of the place indicated too much dampness. Of the children born at this house two died of consumption in adult life, and another was saved from a similar fate by having been sent away to school at comparatively early age.

The pecuniary circumstances of the parents having improved so as to enable them to purchase a new place and build a new elegant mansion, the new locality selected was in the same village but at the top of the ridge, where the sun and air had their full influence. The children who were born subsequently, and there were several, were all of good and robust constitutions, and have enjoyed good health, showing none of the signs of constitutional dyscrasy evinced by those born at the old homestead.

Another family who lived at the foot of the hill near the river, and who were influenced to a still greater degree by the insalubrity of the house, lost all the children, eight in number, by scrofulous complaints before they attained adult age.

A couple, of Scotch extraction, settled upon a clay farm in the Province of Ontario, many years since, and built a frame house. The land was not under-drained, and the house was in time overshadowed with trees. There was for a good part of the year too much dampness in the house and about the premises. The wife died after having a number of children, of a general decline of vitality a few weeks after childbirth; two of the sons died of phthisis pulmonalis, one of acute pleurisy, not a first attack; another son has had an attack of pleurisy of severe character, and a daughter has suffered from Bright's disease. Not one of the children has grown up with the health and strength of the parents.

Shade trees, so desirable as neighbors, when scattered about the grounds and

grown upon the borders of the enclosure, should not be allowed to encroach too much upon the house or to reach over the roof.

They are better friends when kept at a little distance and not allowed to interfere with the free circulation of air and the presence of the sunlight.

Shade trees, when too near and of thick foliage, gather and retain dampness, and exercise in this latitude an unhealthful influence.

Homes must not be embowered in shade. Too much shade impresses the constitution of the family, and particularly those of the children, rendering them susceptible to asthma, phthisis pulmonalis (consumption), scrofula, rheumatism, goitre, anæmia, rickets, hip disease, and the hundred ills that come to our notice when the blood is deficient in color. Those who survive infancy and childhood grow up with weakened frames and diminutive statures, and are liable to run into a decline; and are at best but the shadows of what they might have been under more fortunate management and in air and rooms, and on grounds dried and warmed by the sun's rays.

I call to mind at the present moment, two instances where the shade had probably more to do with the very unfortunate history of the families than had any other agent. The frame house was completely overshadowed by elm trees; in some places the moss was grown over the roof. All the children, and there were five or six, grew up with delicate health, one of the girls a victim of asthma, and two others succumbed to consumption before middle life.

Another similar instance occurred within a few miles of Detroit. The house, although built with a high basement, was damp, as the cellar had no drain. It was completely surrounded by a grove of hickory trees, the foliage of which is very dense. All the children grew up delicate, and several died of consumption before coming of age.

Instances like these might be enumerated to the end of the chapter, and serve to show the want of observation on the part of the people of the most apparent hygienic laws.

A writer upon these subjects observes: "When experienced medical officers see rows of houses springing up on foundations of deep retentive clay inefficiently drained, they foretell the certain appearance among the inhabitants of catarrh, rheumatism, scrofula, and other diseases, the consequence of excessive damp, which break out more extensively in the cottages of the poor, who have scanty means of purchasing large quantities of fuel and of obtaining other appliances by which the rich partly counteract the effects of dampness." In contradistinction to this method of building so frequently recorded, we are glad to mention the fact that exceptions occasionally occur. An enterprising firm purchased in 1871 between seventy and eighty acres in northwesterly portion of Detroit, the soil was composed of a stiff tenacious clay with occasional pockets of sand. This land had been used as a farm and pasture for fifty years or more, and was, although in reality seventy feet above the river, so covered with water in the spring that it was supposed to be almost on a level with the river. They first of all ran lateral sewers through the whole length ten feet deep with the proper grade. These were oval in shape and made of brick laid in cement. These act as surface drains and as drains to any cellars which may be dug on the property. Then they paved the main street, and built brick houses each on a fifty by one hundred and twenty to twenty-four feet lot, with cellars seven to seven and one-half feet deep floored with concrete. A tile drain runs around the foundation of each house, which serves to drain the ground between the houses.

Twenty-eight houses have been put up since 1872, and there have been no

cases of ague or dysentery, or fever; indeed, the locality has been rendered exceptionably healthy. Another gentleman of large landed property has been pursuing a similar course, or at least requiring it to be done, east of Woodward avenue, with similar results upon the healthfulness of the section of the city upon which these improvements have been made. Such efforts should be noticed and encouraged wherever they may be found. The pecuniary advantage, as shown in these instances, has been very great, and ought to encourage others, proving the old saying, that the best is the cheapest way in the end.

In order to elicit the views of the correspondents of this board, the following circular has been addressed them by the committee:

DEAR SIR,—In the preparation of a paper upon Healthful Homes, for the State Board of Health, the Committee on Drainage and Climate is desirous of obtaining information upon the following points, and will feel under obligations to those Correspondents of the Board who will consider them and communicate with the Committee:

1. What is the nature of the soil and the geological formation in your location?
2. What is the practice in your neighborhood in regard to the use of tile draining the ground upon which the dwelling is erected?
3. What, in your opinion, is required to render a house and its surroundings healthful in your locality?
4. What has been your experience in regard to the location of dwellings in your vicinity as regards immunity of families from different forms of disease?
5. From what source do the inhabitants obtain their drinking water, and that used in cooking? If from wells, what is their average depth? In what manner are they constructed? Are they liable to receive the surface water?
6. Do the houses generally have cellars, and if so are they walled with stone, and ventilated and clean, and free from water?
7. Are vegetables allowed to decompose in the cellars?
8. What is the usual mode of disposing of the animal excrement, or fecal and urinary matter?
9. What is the usual mode of disposing of the waste water and kitchen wash?
10. Please give your views upon any matters pertaining to the construction and maintenance of a healthful home.

Adrian.—REPORTED BY ROBERT STEPHENSON, M. D.

1. Soil sandy loam eighteen inches to twenty-four inches in depth, resting on clay ten to forty feet thick; underneath is white sand and then coarse gravel and white sand below until shale is reached at a depth of one hundred feet.

2. The system of sewers is such that tile draining is unnecessary.

3. That the barns and vault be some distance from the dwelling, and the well upon higher ground than the vault and yard.

4. The higher the ground upon which the dwelling is situated the greater the immunity from disease.

5. From wells thirty feet deep walled up with stone and brick. They do not receive the surface drainage.

6. Cellars walled and ventilated, and free from water.

7. No.

8. By cesspools and by sewers, if near.

10. High ground, with plenty of room between floors, well ventilated, and separated from barns and sinks.

Albion.—REPORTED BY JOHN P. STODDARD, M. D.

1. Sandy loam lying on alluvial deposit with here and there the outcrop of the Marshall sandstone.
2. Tile sparingly used.
3. House should be raised two and a-half feet, with cellar six feet below surface.
4. Have been able to trace one or two cases of sickness to a want of drainage, but there are few houses on these locations.
5. Wells wholly supply the water, twenty-five feet depth, generally stoned up; a few are "drive" wells.
6. Yes.
7. More or less.
8. In pits, an execrable way.
9. On surface and by cesspools filled with stones and covered with soil.
10. House on highest point of lot with good cellar; shade trees not too near, and plenty of light, large rooms, and a general cultivation of a happy and contented frame of mind.

Ann Arbor.—REPORTED BY PROF. GEO. E. FROTHINGHAM AND REV. C. H. BRIGHAM.

1. Soil sandy loam resting upon alternate beds of sand and clay drift.
2. No tile draining used so far as known.
3. Better ventilation, especially of cellars, more sunlight, better facilities of removing offal, especially fecal matter. I am suffering from a low form of typhoid fever resulting, I believe, from foul privies in my neighborhood; and a majority of cases of this disease are due to this cause, according to my observation.—(G. E. F.)
4. Favorably located.
5. Mostly from cisterns. A few wells averaging forty to seventy feet in depth. Wells generally walled with brick and stone, but not always free from surface drainage. Cistern water filtered.
6. Cellars under most of the houses, usually good, but poorly ventilated, and many not clean.
7. Very commonly.
8. Close vaults, sometimes in the house. When filled are abandoned and covered one or two feet with soil.
9. Thrown out of back door and into cesspools in a few cases.

Augusta.—REPORTED BY WM. WORSFOLD, M. D.

1. Sandy drift formation.
2. None.
3. Disinfection and proper removal of waste at a greater distance. Elevation of the house sufficiently to ventilate under it, and a better ventilation of the rooms in winter. In this county where the marshes are numerous, I think a screen of evergreens should be planted and might lend a protecting influence in some cases.
5. Good water. Wells 15 to 20 feet; some driven; others curbed, but mostly stoned or bricked, with composition. Generally they do not receive surface water. In the farms they are more careless.
6. Yes; stoned and dry, but not well ventilated.
7. No.
8. The vault is allowed to become too full and is offensive, and is not disinfected.
9. Waste water, slops, kitchen waste is generally thrown too near houses, so that the stench encountered in going to the back premises is usually more or less marked.

Brooklyn.—REPORTED BY E. N. PALMER, M. D.

1. Soil sandy loam fifteen feet, then hard blue clay eight feet, then sand or coarse gravel ten to twenty feet, then sandstone rock.
2. Tile draining is coming into general use where required.
3. Good ventilation, and drains for waste matter.
4. Tho-e away from the creek and on high ground are healthful.
5. Some cisterns. Wells twenty feet deep usually; mostly bricked; some are bored and tubed with iron; but few receive surface water.
6. Good cellars, walled, and dry and ventilated.
7. Not as a rule.
8. Vaults, which are in many cases disinfected.
9. Drain, covered, and cesspools.
10. Avoid marshes, creeks, millponds, and particularly those upon the side of the prevailing winds. Be sure of dry subsoil; good water, not too much shade.

Cannonsburg.—REPORTED BY C. L. CHAMBERLIN, M. D.

1. Sand, clay, and gravelly loam.
2. No tile on account of rolling surface.
3. Build on elevated, but not necessarily the highest ground.
4. Those on highest ground sick the most, especially from malarial fevers.
5. Wells twenty feet, well stoned and not liable to surface water.
6. Yes, good and dry.
7. Not often.
8. Vaults.
9. Surface.

Coldwater.—REPORTED BY J. H. BEECH, M. D.

1. Gravelly loam twenty to thirty inches, reddish hard pan six to eighteen inches, sand and gravel eight to twenty feet, and clay about the same.
2. Tile used at State Public School, where it has been of great advantage.
3. Some substitute for cesspools and privy vaults. The only practical improvement on these is for the first, its removal by wagons, or scattering it over large surface at a distance from house, and for the latter the dry earth plan. Tile draining would be of use in some sections.
4. It is well established that in sickly seasons more than seven-tenths of the cases occur on the east and northeast border of streams or marshes.
5. Wells, twelve to thirty-five feet, bricked and surface water guarded against by banking. Drive wells are used where required.
6. Cellars usually good; some not well ventilated; others well ventilated and clean.
7. Not often.
8. Vaults.
9. Short kitchen drains and cesspools nearly omnipresent.
10. Highest elevation front east; cellar under whole house, five feet under surface and two and a half feet above ground. Well drained if not on very porous subsoil. Ceiling high; ventilating flues in walls. Sleeping rooms large and on east or south sides. Furnace with sheet iron heat chamber, so that house can be dried on moist or humid days readily. A drive well if possible. Dry earth commode. Barns northward from the house, with row of evergreens between. Deciduous trees on all other parts of grounds, not too near.

Detroit.—REPORTED BY W. H. ROUSE, M. D., AND H. F. LYSTER, M. D.

1. Clay sixty to one hundred and fifteen feet to underlying limestone rock, occasional pockets of sandy loam, slightly elevated ridges lying parallel to the river. Land rises from the river to an elevation of seventy-five feet in three miles.
2. Tiles are not used generally except around the foundations of new houses and cellars, and connect with the house drains. Too much reliance is placed upon the sewers, which are supposed to be impervious to water.
3. Tile draining of premises twelve to twenty feet apart, connecting with sewer, is more needed than anything else. House elevated from ground, which should be elevated enough for the water to run off. Houses well ventilated, and with plenty of light, and clean and free from garbage.
4. Detroit river; few wells in city now in use.
5. The better built houses have cellars walled and ventilated and drained. Many of the one and two-story frame houses have no cellars.
6. In some cases.
7. Water closets in better class of houses, and for nearly all cottages or one and two-story frame houses constructed within ten years, vaults are used connected by a drain with the lateral sewer; the drain from the kitchen empties into this vault, and in some cases the water from the caves runs into it. There are many old vaults in use not connected with anything, which are emptied once in a year or two as required.
8. The liquid wash water and waste from the house is carried to the sewer by a deep drain, and the garbage is received into a barrel which is emptied by persons who need it as food for cows, hogs, and chickens. The manure from the stables is also taken out of the city for its value in enriching the soil.

Dearbonville.—REPORTED BY E. S. SNOW, M. D.

1. Clay soil eighty to ninety feet on limestone rock five feet thick. Sand hills along the streams.
2. Seldom done, as the dwellings are upon high ground.

3. Locate on dry ground away from stagnant water. Dry earth system for fecal matter. Kitchen waste to be removed a proper distance.

4. High and dry locations much the healthiest, especially as regards malarial fevers.

5. Wells ten to forty feet deep, walled with brick; seldom receive surface water. Eleven wells in this township sunk through the limestone, are all flowing wells of sulphur water.

6. The better class of dwellings have cellars walled with stone, and clean and ventilated.

7. With farmers it is often the case.

8. Vaults.

9. Carried a short distance in open drains.

10. Dry location away from stagnant water; barns and outhouses a proper distance; dry earth system.

East Saginaw.—REPORTED BY N. H. CLAFLIN, M. D.

1. Clay.

2. Very few lots tile-drained.

3. Surface water removed by drain, and no organic matter allowed to be thrown out. The houses should be elevated above the ground, and permit a free circulation of air, as the ground is level, and after rains is saturated with water.

4. More sickness in dwellings on low ground, and where surrounded with saw dust and decaying slabs, than in those upon higher ground.

5. Wells fifteen feet deep bricked without lime or mortar. Surface water enters heavy.

6. No cellars are dug here. The water would stand in them. In most places it will stand in dry weather in holes three to five feet in depth, and in wet weather, or when the river is high, will come up to the surface. Cellars are built above ground, double walls.

8. Vaults.

9. Surface of ground near kitchen.

Elsie.—REPORTED BY E. V. CHASE, M. D.

1. Sandy and clay loam.

2. Few use tile drains.

3. Little drainage required owing to rolling surface.

5. Wells fifteen feet, planked up or stoned wells. Do not receive surface water.

6. Cellars clean, dry, walled with stone.

7. No.

8. Vaults usually at some distance.

9. Surface of ground, or removed a short distance by drain.

10. General cleanliness of premises and removal of vaults and cesspools to a distance of at least fifty feet, and removal of stagnant water.

Grand Rapids.—REPORTED BY A. HAZLEWOOD, M. D.

1. Sandy loam.

2. Tile not needed.

3. Good sewers and good water, and draining well the lower lying lands.

4. Dwellings upon high ground, freer from malarious diseases than those on low land.

5. Wells, cisterns, and river by water works. Depth of wells eight to fifteen feet, usually protected from surface water.

6. Cellars generally good in all respects.

7. Not according to my observation.

8. Vaults, and wherever there are sewers they are connected.

9. Thrown out on surface, except where there are sewers.

10. Supply of good water, good sewerage and drainage, and ventilation. Dry earth system where there are no sewers.

Howell.—REPORTED BY C. V. BEEBE, M. D.

1. Clay loam predominates.

2. Tile not used generally.

3. Good elevation and ventilation, good water and general cleanliness.

5. Wells depth thirty feet, walled with stone and protected from surface water.

6. Good cellars, walled, and ventilated and dry.

7. Not generally.

8. Vaults.

9. Surface of ground at kitchen.
10. Ventilate through pipes leading to chimney. A bath room in every house.

Hastings.—REPORTED BY A. P. DRAKE, M. D.

1. Sand and clay loam lying upon gravel and blue clay.
2. Not needed.
5. Wells twenty to fifty feet deep.
6. Good cellars.
8. Vaults.
9. Surface of ground.

Homerville.—REPORTED BY O. S. PHELPS, M. D.

1. Clay loam resting upon gravel and clay subsoil, and below this for from twenty to twenty-five feet loose gravel dipping southwest.
2. Not used.
3. Dry earth system most important improvement needed here.
5. Wells twenty-five feet, walled with brick or stone in most cases.
6. Good cellars.
7. In some cases.
8. Vaults or upon surface of ground.

Hillsdale.—REPORTED BY J. W. FALLEY, M. D.

1. Sandy and clayey and gravelly loam, rolling.
2. A great deal of tile draining has been done, although most of the county has good natural drainage. The lakes have in many cases been lowered and marshes drained. Though we have three times the population of twenty years ago, we have not one-fourth the amount of malarial disease. Even pneumonia has changed in similar ratio.
3. No change is required in most cases, the drainage and water supply is so excellent.
5. Wells twenty to sixty feet deep, well stoned and protected from surface water.
6. Cellars excellent and well made and clean.
7. Not usually.
8. Vaults, except at county house and a few other places where the dry earth system is used.
9. Ordinary ways, cesspools or surface of ground.

Hubbardston.—REPORTED BY H. W. BROWNE, M. D.

1. Sandy and clayey soil, rolling.
2. Tiles not used.
3. Good cellars and ventilation, and light and cleanliness.
5. Wells twenty feet, chiefly stoned up. There are some old barrel or planked wells; many "drive" wells.
6. Cellars usually walled with stone or plank; usually dry.
8. Vaults not common, surface privies used generally.
9. "Thrown out at back door, as near to the well as can be done handily." Of course there are exceptions.

Kalamazoo.—REPORTED BY W. B. SOUTHARD, M. D., AND H. O. HITCHCOCK, M. D.

1. Gravelly loam and clay twelve to twenty inches thick resting on gravel bed.
2. No tile draining.
3. Houses should be built upon foundations four feet above surface, to allow of ventilation of cellars.
4. More sickness in houses near the river than in those upon the plain above.
5. Holly water works supply one-third the people. The water is from a spring twenty-five feet below the ordinary water level. Many wells bricked up twenty-two and twenty-four feet deep. Some are liable to receive surface water. Many of the recently constructed wells are "drive" wells.
6. Most of the houses have cellars; some have none.
7. Not usually.
8. Vaults frequently within twenty to thirty feet of well. A few earth closets.
9. Cesspools and surface of ground. There is no system of sewerage.
10. Houses should be well elevated. Earth closets should be used in preference to vaults. If wells are used they should be drive wells. As much sunlight should be admitted to houses as is possible.

Lansing.—REPORTED BY J. B. HULL, M. D., AND IRA H. BARTHOLOMEW, M. D.

1. Clay loam resting on clay from fifteen to twenty feet, then sand. The formation is chiefly of a limestone character.
2. Tile draining is used to a limited extent.
3. The general use of tile drains and the proper disposition of slops and garbage.
4. Dwellings over undrained cellars have usually more disease.
5. Wells eighteen to twenty-five feet deep to the sand. They are stoned or bricked up. Many protected against surface water.
6. Cellars usually walled up, but not always dry, as many have no drains. They are tolerably ventilated and clean.
7. Not usually.
8. Vaults, and leach into the clay.
9. Waste from kitchen spread out on gardens or removed usually; in some instances thrown over the premises.
10. Houses should be elevated and cellars drained with tile and kept clean. Dry earth system should be used. The only cases of typhoid fever here to my knowledge have occurred where the slops were not properly removed, and when the well became poisoned from the vaults. The wells should be protected by mortar and cement from surface water. Impure water causes more sickness than any other cause.

Lexington.—REPORTED BY A. M. OLDFIELD, M. D.

1. Eastern, clay, and in western part sand.
2. Tile not generally used.
3. Cleanliness.
5. Western part, springs, eastern part, wells; average depth fifteen feet deep, stoned. These wells depend upon surface water for supply.
6. Many do not have cellars.
8. Vaults.

Marquette.—REPORTED BY GEO. J. NORTHROP, M. D.

1. Sand over a sedimentary schist.
2. No tiling needed.
3. Cleanliness.
5. Lake Superior and wells; wells forty to ninety feet deep, and curbed with plank. Some are liable at times to surface water.
6. Usually have cellars walled with stone or plank, usually stone.
8. Vaults.
9. Thrown upon ground; a few drains and sewers; no regular system.

Mendon.—REPORTED BY H. C. CLAPP, M. D., AND EDWIN STEWART, M. D.

1. Sand and gravel with gravel sub strata.
2. Not used.
3. Cleanliness, dry and well ventilated cellars, good water, vault at some distance, not too much shade, house away from marsh or stagnant water. High and dry situation for house.
4. Those living on the prairies least liable to sickness, those in openings, more so, and those in heavy timbered land, most of all.
5. Wells twenty to thirty feet deep, generally curbed with wood, but a few walled up with brick and water lime; not liable to receive surface water.
6. Cellars usually built and walled up, dry and clean, and well ventilated.
7. Very seldom any decomposing vegetables in them.
8. Vaults.
9. Surface of ground at back door.
10. Ventilation and sunlight, elevated situation, open fire-places in the rooms.

Milford.—REPORTED BY ROBERT JOHNSTON, M. D.

1. Clay.
2. No tile used.
3. Cleanliness, ventilation and underdrainage, and removal of fecal matter.
5. Wells, of good depth.
6. Good cellars, ventilated, and dry and clean.
7. No.
8. Vaults.
9. Thrown on the garden.

North Lansing.—REPORTED BY O. MARSHALL, M. D.

1. Clay soil and subsoil with veins of sand and gravel.
3. A better system of sewerage and water supply; houses should be better ventilated.
4. The families living near the stagnant water and low lands have more sickness.
5. Wells about twenty feet; in wet weather many receive surface water if open. There are many drive wells.
6. A majority of houses have cellars and these are walled with stone. Ventilation is not good, and from the nature of the soil they are damp and mouldy.
7. Yes, often; but not different from other towns.
8. Vaults.
9. Generally on surface of ground near back door.

Otsego.—REPORTED BY MILTON CHASE, M. D.

1. Sand, clay, and sandy and gravelly loam.
2. No tile draining.
3. Those on sandy soil and away from the water are less liable to rheumatism, typhoid, and malarial disease.
5. Wells, many of them thirty feet deep, bricked up or curbed up with oak boards. A few use water from cisterns and springs and wells liable to receive surface water.
6. Cellars under the majority of houses, and many are not well ventilated, or drained or cleaned. Less than one-half are walled up. Some on clay soil have drains.
7. Many cellars are not free from decaying vegetables.
8. On surface or in shallow vaults.
9. Surface of ground at kitchen door.
10. Every town, village, and city should employ a sanitary architect to advise as to the location of the house and about the construction.

Otisville.—REPORTED BY A. W. NICHOLSON, M. D.

1. Sandy and clay loam.
2. But few instances of tiling.
3. Cellars should be more frequently placed under the houses. Many of the houses are upon blocks.
4. The houses should be elevated from the ground and built upon higher portions of ground. Of forty-one cases of malarial fever, forty were in houses resting upon blocks of wood and having no cellars. In a recent serious epidemic of scarlatina, the most serious manifestations of the disease were where the dwellings were nearly enclosed by trees and shrubbery. In such situations pulmonary difficulties are strikingly manifest.
5. Wells twenty-four feet deep. The shallow wells are usually stoned, but are frequently recipients of surface water. The deepest are driven, and have a walled basin about ten feet in depth.
6. Cellars under the new houses; a large number of the older houses have none. In the latter there is substituted an unwallled and undrained excavation, not clean. The new cellars are walled with stone and drained with board drains, but not well ventilated, and decomposed vegetables are frequently left in them.
8. Vaults.

Paw Paw.—REPORTED BY JOSIAH ANDREWS, M. D.

1. Sandy loam on blue clay from two to sixty feet.
2. No tile draining.
3. House in many cases too densely shaded.
4. Families living near bank of river and mill race more liable to malarial disease.
5. Wells, ten to seventy feet deep; generally bricked up; some are drive wells. Very few liable to surface water.
6. Cellars under most houses, ventilated, clean, and generally free from water.
7. I think not.
8. Vaults.
9. Surface drainage.
10. Sunlight, dryness, ventilation, and pure water.

Port Huron.—REPORTED BY C. M. STOCKWELL, M. D.

1. Sandy and clay loam, on blue clay 75 to 100 feet.
2. Very little tile draining.
3. Thorough under draining with porous tile, and cemented basement floors.

4. Those living upon sand plains or ridges have far greater immunity from disease than those upon clay soil, although the sand retains water in many places.

5. Northern Lake water from St. Clair river by Holly system of water works. Formerly from wells ten to fifteen feet deep, and consequently mostly surface water.

6. Cellars are low, a majority of these are not walled nor ventilated, nor free from water.

7. In a few instances.

8. Vaults.

9. Surface of ground; occasionally carried off by box drains.

10. Double walled and ventilated, and well lighted houses. Underdraining by tiles; cement cellar floor; good sewer for drains to connect with water closets.

Port Sanilac.—REPORTED BY J. M. LOOP, M. D.

1. Sand and clay loam resting on clay stratum fifteen to thirty feet thick.

2. Little used.

3. Drainage.

4. Location does not make so much difference here as the manner in which the dwellings are kept.

5. Wells, of variable depth; many contain only surface water.

6. Cellars not frequently found. Some of those are walled with either stone or wood.

7. Not generally.

8. Vaults.

9. Surface of ground near kitchen.

10. Drainage, deep wells, dry earth system.

St. Clair.—REPORTED BY A. L. PADFIELD, M. D.

1. Part sandy loam, other sections tenacious clay; limestone foundation.

2. Tile draining is becoming common lately.

3. Houses should be upon stone foundation two or three feet above ground. Tile should be used.

4. On low lands in the city malarial fevers are more prevalent than on higher ground.

5. Wells are chiefly used (generally surface water), ten or twelve feet deep.

6. Cellars usually made, but not always clean, and almost always wet. They are the cause of much sickness. Overground cellars are becoming more common.

7. When cellars are wet vegetables usually decompose in them.

8. Shallow vaults.

9. Surface of ground.

St. Joseph.—REPORTED BY R. F. STRATTAN, M. D.

1. Sand and clay alternating. Away from lake a rich loam with subsoil of gravel through which water passes freely. The sand generally rests on clay. At about seventy-five feet the finest beach sand is found, and in this we get the best water.

2. The better class of people drain the ground.

3. Perfect drainage of surface for at least twenty rods in all directions. Cellars should be dry. House should not be shaded, and should be located on highest part of the ground. Cleanliness.

4. Houses upon east side or near marshes have more sickness, particularly malarial fevers.

5. Wells six to twelve feet deep, and liable to receive surface water. A few wells are seventy-five feet deep, and contain the best water.

6. Not half the houses have cellars. The cellars are damp and filled with water once a year.

7. No.

8. Vaults.

9. Surface of ground near the kitchen. Some spread it on the garden.

St. Johns.—REPORTED BY G. E. CORBIN, M. D.

1. Fifteen feet of clay upon quicksand of undetermined depth.

2. Not generally used.

3. Cleanliness more needed as regards disposition of refuse.

5. Wells, twenty to thirty feet. In some places much less in depth. Generally well built and walled up, and free from surface water.

6. Cellars well built generally, and walled up and dry.

7. With some families frequently; in others, never.
8. Vaults, sometimes disinfected.
9. Surface of ground.

Tecumseh.—REPORTED BY C. M. WOODWARD, M. D.

1. Clay loam fifteen to twenty feet to gravel.
2. Not commonly used or required.
3. Cleanliness, and the proper removal of garbage and fecal matter.
5. Wells thirty feet deep, walled up with brick; some are driven or artesian.
6. Cellars, usually, well made, ventilated, and drained.
7. Seldom.
8. Vaults.
9. Some drains, and others upon surface of ground away from the building.
10. Drainage; good cellars; walls of house hard finished; vaults at least sixty feet from house; wells seventy or eighty feet from the residence, unless earth closets are used.

Three Rivers.—REPORTED BY L. S. STEVENS, M. D., AND C. W. BACKUS, M. D.

1. Sandy and gravelly loam.
2. Not used.
3. Good cellars, dry and ventilated.
4. Families on east side of millpond and river more subjected to intermittent fevers.
5. Wells, thirty-two feet deep, well made; many drive wells used; not subject to surface water.
6. Cellars well built, and ventilated and dry.
8. Vaults some distance from house.
9. Drains used, mostly wooden pipes.
10. Good water, dry soil, large, well ventilated cellars; and refuse carried well away.

Thorneville.—REPORTED BY JOHN S. CAULKINS, M. D.

1. Clay and clay loam and sandy loam. The drift is very thick, no rock having been reached at one hundred and twenty feet. The Michigan salt group lies under this.
2. Tile draining of premises about the house has not been practiced here.
3. The dwelling should not be to the north or east of stagnant water or wet lands. If this cannot be avoided, make drainage as perfect as possible and leave or plant trees to the south and west.
5. Wells, springs, and cisterns. Wells are chiefly used, varying from ten to one hundred feet; average twenty to thirty feet. Those on sandy land are the deepest. Those on clay land are dug to the water and walled up with stone. Drive wells have been used, but the water usually is roily.
6. Cellars common, usually walled with stone; ventilation frequently imperfect. In some cases, on clay ground, damp.
7. Too frequent.
8. Vault.
9. Usually a drain near kitchen door; not always kept free and clean, and is offensive.
10. Ventilation; hard finish to walls.

Vermontville.—REPORTED BY WM. PARMENTER, M. D.

1. Sand and clay.
2. Only in one instance.
3. Good surface drainage and general cleanliness.
4. In houses near swamps, pools, and soil for the first time disturbed, there are more cases of malarial fevers.
5. Wells mostly; springs in a few cases; average depth thirty feet, stoned up. Of late years a few lined with pine tubes. Many are liable to surface water.
6. Cellars walled up with stone and dry. Wet in spring generally.
7. Probably not.
8. Vaults; a few dry earth; some cases no vaults.
9. Conveyed a short distance by drains.
10. Cleanliness, dryness, and sunlight.

Wyandotte.—REPORTED BY E. P. CHRISTIAN, M. D.

1. Yellow sand for the most part, eight or ten feet in deepest part. A part directly on the clay. There the land is low, but little above the river.

2. Very little tile draining.

3. The greatest necessity is a system of sewerage for removing contents of cess-pools and vaults.

4. There is a greater prevalence of malarial disease on lower ground, although the water there is probably better. This is accounted for by the want of drainage and the humid soil.

5. Surface water collected in wells of a depth of from four to twenty feet. They are usually stoned or bricked.

6. Cellars usually built outside and not under the houses. Walled up, ventilated, and dry.

7. I think not.

8. Vaults.

9. No sewers and few drains, and soil is permitted to absorb all the waste water.

10. Dry soil; pure drinking water; plenty of soft water for bathing; good sewerage; and prevention of contamination of soil with decaying organic matter.

Walled Lake.—REPORTED BY E. A. CHAPMAN, M. D.

1. Sand, gravel, and clay.

2. Tile draining of premises not practiced.

3. Thorough tile draining, clean cellars, and removal of waste matter.

5. Wells chiefly; average depth twenty-five feet, stoned up; many drive wells. Open wells are liable to surface water.

6. Cellars generally used; walled with stone. Many not clean or free from water.

7. They are, in many instances.

8. Vaults.

9. Surface of ground near kitchen.

Ypsilanti.—REPORTED BY EDWARD BATWELL, M. D.

1. Gravelly loam four to thirty feet resting on hard blue clay. Under this the water is found.

2. Not much drainage required on account of elevated character of the ground.

3. Strongly opposed to underground cellars under the dwellings for storage of vegetables.

5. Good wells, not liable to surface water. The water coming from below the clay is not liable to be contaminated.

6. Good cellars, dry and free from water.

8. Vaults.

From the replies of the several correspondents, it is apparent that there are many points upon which they all agree in regard to the best means of preserving the health of the people. Among the most important, seem to be the necessity, in all parts of the State, to remove dampness from the dwelling and its surroundings, not to permit too much shade, to allow plenty of sunlight and air in the house, to supply good water, and to carry away and remove all decomposing and waste matter.

The material from which the house should be constructed has not been spoken of. So long as dryness is obtained, it is not important. The necessity for the avoidance of poisonous wall paper has already been forcibly pointed out in a previous report of this board, and the value of walls of hard finish will be more and more appreciated as the people become educated in the necessity for the disinfection of houses after contagious forms of disease have occurred.

The several modes of the ventilation of dwellings depend so greatly for their successful employment upon the peculiarities of the heating apparatus used, that they would occupy too much space for their complete elucidation here. We would, however, remark, that every facility should be afforded for perfect ventilation by constructing ventilating shafts connecting with or adjoining the

chimneys where possible, with openings, near the floor and ceiling, furnished with adjustable registers where furnaces and stoves are used. The upper opening is more particularly for use in the Summer to let out the warm air. The open fire-place will obviate the necessity of the lower opening in rooms where it is relied upon for heating.

It will be seen by those who have taken the time and patience to follow the several ideas and principles outlined in this report, that much can be done by every one, however limited his purse, in the way of locating and constructing a dwelling in accordance with our present knowledge of sanitary laws. Remembering that the violation of any law of nature is followed sooner or later by a punishment commensurate with the degree of such infringement, he who erects and maintains his dwelling in accordance with known and recognized sanitary teachings, lays the foundation on a rock which will stand, and builds upon it a habitation that will prove in every sense a home.

ILLUMINATING OILS IN MICHIGAN.

A LECTURE DELIVERED BEFORE THE LEGISLATURE, JANUARY 25, 1877,

BY

Prof. R. C. KEDZIE, M. D.,

MEMBER OF THE

STATE BOARD OF HEALTH,

AND ITS COMMITTEE ON SPECIAL SOURCES OF DANGER TO LIFE, ETC.

ILLUMINATING OILS IN MICHIGAN.

SENATORS AND REPRESENTATIVES: I thank you for this opportunity to address you on the subject of illuminating oils, and in behalf of the State Board of Health to present a plea for the safety and lives of the people of this commonwealth.

Before our law creating the office of State Inspector of Illuminating Oils was enacted and enforced, the newspapers were filled with recitals of deplorable accidents from the use of coal oils of low grade. You could scarcely take up a daily paper of our State without seeing the startling head-line, "ANOTHER KEROSENE HORROR." People got the idea that such calamities were the natural if not necessary result of using the inflammable material. But since this law has been enforced, scarcely a single accident has occurred in the use of kerosene in our State. So complete has been the change that the people are fast forgetting the terrible history of the past, and many are now demanding a retrograde step towards the former conditions of danger. Nor have the good effects of our law been confined to our State. Other States have followed our lead and enacted similar laws for protection of the public. Even States which have not passed such laws have felt the benefit of the exposures here made of the villainous Ohio inspection, because the refiners were compelled to make a better oil and inspect with more care. Thus the protection which your wise legislation has afforded the people of our State has carried a certain degree of protection to neighboring States. Michigan stands in the front rank of States in the protection she has thrown around the lives and property of her citizens, and a backward step on our part will cause increased insecurity in other States.

So far as security to person and property is concerned, the people of our State are to be congratulated: so far as the burning quality of most of our oils is concerned, they are to be pitied. The "people sitting in darkness," but (thanks to our law) not "in the land of the shadow of death," have still a right to demand something better than the wretched stuff so generally sold as kerosene. They do right in complaining and in demanding a change for the better. But the change must be one that will effectually remove the evil without impairing the public safety. Kerosene is emphatically the illuminating material for the masses. Outside the cities and large villages it is almost the only material used for artificial light. Legislation on this subject therefore reaches almost every home in our State, and any legislation which shall increase the danger in its use, or diminish the present conditions of safety, will cast a shadow over the homes of the great mass of our citizens. Every one is interested in securing safe tests for an article in such general use. The question does not alone concern the

safety of the family using it, but the community are also interested. In the Farmers' Institute at Grand Traverse, where this subject was brought up, Judge Ramsdell said: "Every one is interested in securing safe oil. If any family in this village uses unsafe oil, *the whole village is endangered*; if by the use of low-grade oil a man sets his house on fire, the whole village may be wiped out, and if the wind is high and in the right direction, no human power could save it." It is said that the great Chicago fire originated in a cow's kicking over a kerosene lamp. If the oil had been good Michigan test oil instead of the inflammable material it was, the fire might have been extinguished, and the greatest fire in modern history might have been avoided. Chicago learned to her cost that she had an interest in the quality of the kerosene used by her humblest citizens. Even if people say they are willing to incur some risk of personal safety for the sake of better light, it is not the part of wise legislators to aid and abet such incendiary and suicidal cravings, provided some better and more effectual means can be provided for removing the evils complained of.

Before speaking of the qualities of illuminating oils, let me call your attention to the method of refining oil, because this will aid us in understanding many of the points involved in the oil question. In order to intelligently enter upon this subject, I visited Cleveland last month and spent several days at the refineries, in order to become familiar with the details of this process.

PETROLEUM.

Petroleum is the crude material as it is pumped from the earth. This is brought from "the oil regions" of Pennsylvania, in the vicinity of Titusville and Oil City, but large quantities are now brought from Butler county. The Butler county petroleum has been in use only a short time, and differs from the petroleum in other parts of Pennsylvania in having a very large amount of paraffine. This fact may help to explain the large amount of paraffine found in our kerosene of late. Petroleum is also largely produced in West Virginia.

REFINING.

Refining consists in separating the complex materials contained in petroleum, by distilling and condensing. The crude petroleum is placed in large iron stills made of boiler-plate, which resemble steam boilers. They vary in size from 85 barrels to 1,000 barrels. The stills are heated like steam boilers, and the vapor produced is condensed in condensers made of gas pipe, which are placed in long wooden boxes filled with cold water. These boxes are usually 4x4 feet in cross section, and are 200 to 250 feet long; in the bottom of this box the iron condensing pipes are placed side by side and run the whole length of the box; a stream of cold water enters one end and is discharged as warm water at the end nearest the still. The condensing pipes all end in a "receiving house," and the condensed products of distillation are received in troughs, from which they run into large cisterns for storage, being run into different cisterns according to their quality, especially their specific gravity.

When the still is heated up by the fire, the petroleum soon begins to boil and the lighter products pass off in the form of vapor; then heavier materials pass over in the form of vapor; and last of all some tarry matter is left in the still. The first materials which are vaporized are not condensed by cold but escape as gas; then a very volatile oil passes over which may be condensed by a freezing mixture, but not by cold water. This oil boils at 65°, and produces very intense cold by its evaporation. It is called Rhigolene (frost oil) from the cold it pro-

duces when rapidly evaporated. It is used by dentists and surgeons to destroy the nervous sensibility by freezing the part. Here is some of the oil. It is exceedingly dangerous because it is one of the most volatile and inflammable liquids known. If this bottle should break in this room, with all these lights burning, an explosion would be the natural result. Mr. Stearns' drug store in Detroit was burned a few years ago by means of Rhigolene: a boy carried a tray filled with bottles of this oil down cellar; he probably dropped the tray, for a crash of breaking glass was heard; the inflammable vapor almost instantly reached the furnace and the cellar was at once filled with flame, so that not a single person escaped from the burning cellar, and those in other parts of the store had great difficulty in escaping.

Rhigolene is not saved at the Cleveland refineries, but escapes with the incondensable gas (Cymogene). The first products of distillation saved at the refineries are stored together under the general name naphtha, and this continues to be stored as naphtha till the density of the liquids distilled reaches 63° Beamé of the coal oil hydrometer. The products of distillation from this point are stored in another reservoir under the name of kerosene, and it continues to be stored as kerosene till the gravity becomes 51° Beamé. At this point a heavy oil containing a large amount of paraffine comes over, and this is usually stored as paraffine oil. A good deal of this paraffine oil comes over in the last part of the distillation of kerosene. A quantity of tarry matter remains behind in the still, which is usually distilled in a separate retort, and affords more paraffine oil, and leaves a heavy coke behind in the retort.

According to Prof. Chandler, 100 parts of crude petroleum will yield 16½ parts of naphtha (including gasoline and benzine), 55 parts of kerosene, 19½ parts of paraffine oil, and 10 parts of coke, etc. But Cleveland refiners claim to do better work than this—that they can get 70 to 75 barrels of kerosene from 100 barrels of petroleum.

The first materials which are condensed are the lightest and most combustible—the density of the liquids increases constantly as the distillation proceeds, and their combustibility as constantly decreases, till we reach the paraffine oils, when the combustibility very rapidly decreases, and the oils become very difficult to burn in ordinary lamps. The naphtha and the paraffine oils bring but a small price in the market, because there is very little demand for them compared with the amount produced. On the other hand, kerosene is in very large demand and commands a good price. Paraffine oil is worth about 10 cents a gallon, and naphtha 3 or 4 cents. There is so little demand for naphtha that the Standard Oil Company were burning it instead of coal to heat their retorts in refining petroleum. The refiner finds, therefore, for his lightest and his heaviest products but small demand and little profit: for his middle products, a large demand and heavy profits. The difference between naphtha and kerosene is not *in kind*, but *in degree*. The dividing line between heavy naphtha and light kerosene is a perfectly arbitrary one; the difference is that the naphtha is a little more volatile and inflammable than the kerosene. The refiner, then, is tempted to run into the kerosene as much naphtha as he can, to increase his profits. He finds this lowers the test, and to bring up the test he runs in some of the paraffine oil, which brings up the test. I have brought up the test of an oil 14° by adding paraffine. He can thus make a profit both on his naphtha and paraffine oil. If he can run into each barrel of kerosene 5 gallons of each of these adulterants, he will make a clean profit of more than \$2 on each barrel of oil. In works where 6,000 barrels of oil are refined every day, the profits on

such an operation would be enormous. Perhaps it would not be possible to practice so large an adulteration, especially as regards the naphtha; but I have the best of reasons for believing that a very large amount of paraffine oil is thus added to Michigan oil, and the refiner's profit on every gallon of paraffine oil added to our oil is not less than 20 to 25 cents. There is nothing in our law which will prevent the refiner adding all the paraffine oil he chooses.

But the influence of this paraffine oil on the burning quality of kerosene is very injurious: the lamp burns dimly, the wick chars and gums up, and the light will often go out before half the oil is consumed; when the light is extinguished, a stifling smoke escapes from the charred wick. When such oil is cooled to a low temperature, the paraffine will separate, and the oil becomes white, thick, and turbid, or even becomes solid, like lard. I have a specimen of such oil bought for my own use, which I could not burn with any satisfaction; it was from the Standard Oil Company, and sold as "Michigan State Oil." By chilling and filtering I extracted four ounces of solid paraffine from one quart of the oil, or a pound to the gallon. Here is the paraffine taken from one quart. From all parts of the State we hear complaints about the oil freezing; in some places they have to get the barrels in by the stove and thaw the oil before they can pump it out. From the same quarters we hear the complaints that the oil will not burn. *That is not Kerosene!* There may be some kerosene in it, but it is essentially paraffine oil. No oil containing so much paraffine oil will burn in our ordinary lamps, no matter what is the inspection test. Here is a lamp which contains some of the 120° oil, for which people are petitioning, to which I have added some paraffine oil, and you see how it burns. Suppose you reduce the test to 120°, and suppose the refiners find it for their interest to reduce the test still lower, they may find it to their interest, as they certainly do to their profit, to run into the 120° oil enough paraffine oil so that it would not burn satisfactorily; and the people would again demand a reduction of the test, so that they could have an oil that would burn. The refiners, through their agents, tell the people that it is our high test that causes the oil to be of such wretched quality. I venture to say that our high test has no necessary connection with this poor burning quality. I have some oil which is "legal test" which burns as brightly as any oil I ever used. I have placed here side by side two lamps exactly alike and trimmed in the same way in all respects except that one contains a pure water-white oil, free from paraffine, which flashes at 141°, and is therefore a little above our test, while the other contains a "water-white headlight oil" which flashes at 115°. They have both been burning here undisturbed for more than an hour; tell me which gives the best light. Several voices say "No. 1," and one says "No. 2." You are not unanimous in your opinions, and this shows that there is very little difference between the lamps, so far as the quality of light is concerned. Lamp No. 2 contains 115° oil, and No. 1 contains our heavy 141° oil, yet a majority say that this gives the best light. This demonstrates that the poor burning quality of "Michigan test oil" has no necessary connection with our high test. But the oil in lamp No. 1 contains so little paraffine that when it is cooled for hours down to zero it remains perfectly clear and transparent. It is because our oils have been adulterated with paraffine oil that they will not burn. I do not care how high the test is, if the oil is free from this paraffine oil it will burn well; and if any oil is heavily laden with paraffine oil, I care not how low the test, it will not burn well. Here are two lamps exactly alike and trimmed in the same way, and filled with oil from the same barrel; but the oil in one lamp contains the

same amount of paraffine as was found in the oil, while the paraffine has been extracted, as far as possible, from the other by chilling and filtering. You can judge of the influence of the paraffine on the burning quality by comparison of the flames of these two lamps.

The presence of paraffine has a singular power of lowering the capillarity of oil. I tried the following mode of comparison: I took several glass tubes of the same size, and placed some candle-wicking inside the tube. The wicking was thoroughly moistened with oil, and the tubes placed in oil of different qualities to see how high the top of the tube could be carried above the surface of the oil and the flame continue to burn steadily at the top of the tube. With good Michigan test oil, I found the flames would burn for hours at the height of 93 millimetres ($3\frac{5}{8}$ inches) above the surface; but with paraffine-laden oil only at 7 millimetres ($\frac{1}{4}$ inch); after chilling the oil and filtering out the paraffine, the flame would burn at 80 millimetres ($3\frac{1}{8}$ inches) above the surface; the capillary power by which alone the flame is fed, is therefore more than ten times as great after the paraffine has been removed. This explains why it is so difficult to make a lamp which contains this paraffine oil burn for a long time; the capillary power is too feeble to draw up this thick oil in sufficient quantity to sustain the flame, and the lamp goes out before half the oil is consumed. This evil is often increased by the form of the lamp in most general use. The lamps are usually globular in form, and when only a small part of the oil in the lamp is consumed, the distance between the surface of the oil and the flame is much increased, thus increasing the distance through which the oil must pass by capillary action. If the lamps were flat-topped and with a shallow well like these before you, the deficient capillarity of the oil would not be so evident. Another cause which makes these oils burn so poorly is the use of too small and hard-twisted wicks. If folks would use No. 2 burners, with very soft and porous wicks, they would find less trouble with their kerosene. More light is given with a No. 2 burner than with a No. 1, with the same consumption of oil.

Another fact does not seem to be generally known, although I pointed it out nearly two years ago, viz.: that kerosene rapidly deteriorates by exposure to sunlight. Here are two bottles of kerosene, one clear as water, and the other dark yellow; yet they were filled from the same can of kerosene, and have stood side by side for several weeks; one was exposed to sunlight, while the other was wrapped in paper impervious to light. In one bottle the sunlight has changed a part of the oil to a tarry substance, which remains dissolved in the oil and colors it yellow, while no such change has taken place in the other. If I add some sulphuric acid to this yellow oil quite a heavy deposit of tarry matter will form, but none in the other oil. Any kerosene long exposed to sunlight will burn less freely, and all lamps should be kept in a dark closet when not in use. But manage our lamps as we may, if we have poor oil we shall have poor light. The people justly complain of the quality of the oil; it is an outrage to palm off such stuff for kerosene oil. The refiners who are the authors of this outrage coolly reply that this poor burning quality is a necessary effect of our high test, that we can never have a good oil with our present test, and that the way, and the only way, to remove this evil is to reduce our test. I readily concede that the light products of distillation will burn more freely than the heavy products. The most freely burning of all these oils is rhigolene, but you might as safely burn gunpowder. Gasoline and naphtha will burn better than any kerosene. The low-test kerosene will burn more freely, other things being equal, than the high-test. The question is not which will burn the most readily; for if that

were the question, we would select naphtha at once, which will burn better than any kerosene. The question is, can we have an oil that is safe to use, which will burn sufficiently well for all practical purposes? I answer, we do have such oil in certain grades of water-white oil (*i. e.* oil free from paraffine), as you may see by this lamp before you. This lamp very plainly disproves all the statements of the oil men that we cannot have a good oil with our high test. There is no trouble in making such oil, the only trouble is that it is not so profitable to make as the low grade kerosene. If naphtha and paraffine oil should ever become more valuable and salable than kerosene, we shall hear no more about the difficulty in making Michigan test oil, nor any complaints that high-test oil will not burn freely. Till that time comes, we must watch the refiners and receive their statements with due allowance, because they are interested parties.

The people also complain because the high-test oil is more costly. Of course, no intelligent man will claim that the remarkable advance in the price of kerosene all over the country during the last year, has any connection with our high test. This is the result of a combination of the principal oil refiners, who control the market. But high-test kerosene, every where, costs more than low-test. Gallon for gallon it costs more, but is it therefore more expensive? I was surprised at Grand Traverse to hear that "the high-test oil not only costs more, but would not burn so long as low-test." This statement was so opposed to known facts, that I determined to test it accurately. I took two exactly similar lamps, filled one with high-test and the other with low-test oil; weighed the lamps and oil; lighted them and kept the blaze at equal intensity, and after allowing them to burn side by side for a certain time, I weighed the lamps to find how much oil each had consumed. While the high-test oil had lost four ounces, the low-test had lost five ounces. I have tried the experiment in many ways, both by measuring the amount of oil that was consumed, and by weighing the same, but always with the same result, viz.: the low-test oils always burned away faster than the high-test, when the light was the same. The low-test oil sells for 28 cents wholesale, and the best high-test for 35 cents,—an increase of one-fourth; but the low-test oil burns away one-fourth faster, so that measured, not by the gallon, but by the amount of light, the high-test oil is as cheap as the low-test.

SAFE OIL.

The most important question is, *What is a safe oil?* I think you will all concede that *oil that will bear our test* IS SAFE. For nearly two years in which our test has been enforced, not a life has been lost or a serious accident occurred by the use of such oil. Will oil of a lower grade be equally safe? Most emphatically, NO! Will 120° oil be safe enough for common use? Ninety-nine persons may use it without accident, but the hundredth man may have an accident and go up in a chariot of fire. In estimating the degree of safety required for any oil in general use, we must consider the accidents which are liable to happen; chimneys will break or fall off, lamps will break by dropping and otherwise, and we must have an oil that will be safe when such accidents occur. The brass fittings of lamps become heated, and when the oil is splashed against the heated parts, explosive vapors will form if the oil is of low test. Accidents are very liable to occur when the lamp is partially empty and is carried in the hands. The following case will illustrate how such accidents most frequently occur:

The Dubuque Times says that a lamp explosion occurred in a house in Four-

teenth street in that city. A little colored girl employed in the family went to the kitchen in the evening to light the fire. She then took the lamp from the table and started to return to the sitting-room, and before she got out of the kitchen the lamp exploded with the force of a gun-shot, scattering fragments of glass all over the room. One piece struck the little girl on the cheek, cutting a gash nearly two inches in length, and deep enough to bleed profusely, and others tore the skin from the fingers of the hand which carried the lamp. Fortunately the light was extinguished by the bursting of the lamp.—*Baltimore Underwriter, Jan. 18, 1877.*

I have made many experiments to determine the comparative safety of such oil as the people are petitioning for, and the oil that our laws now require. I have filled lamps with the "Michigan-test" oil and others with "Headlight" oil. These lamps were left to burn in a warm room for a time, and then broken without extinguishing the flame. With our oil the flame was either extinguished, or a long time ensued before the body of the oil took fire; with "Headlight" oil the flame rapidly extended to the oil and burned fiercely. I am satisfied by these direct experiments, where the conditions of an accident were as accurately reproduced as possible, that our "Michigan-test" oil is far safer than any oil of a lower test.

WHY LAMPS EXPLODE.

Some persons seem to think that the explosion of a kerosene lamp is caused in the same way as a boiler explosion, viz.: By the pressure of the vapor of the oil inside the lamp. In rare instances explosions may be caused in this way; for example, where the ignited oil overflows the lamp and the lamp is enveloped in flame. But explosions usually occur in another way, viz.: Where the vapor of kerosene is mixed in proper proportions with air, and thus a *true explosive mixture is formed*, which will explode with the force of a gun-shot, when fired by a flame. This explains why a lamp is in more danger of exploding when only partially filled with kerosene, because a larger amount of space is filled with the explosive mixture; it is the same as a larger load of powder in a gun.

Many persons suppose that there can be no danger of a lamp explosion unless the whole body of the oil in the lamp is heated to the flashing point; that because the temperature of our rooms never rises to 120°, there can be no danger in using oil whose flashing point is 120°. But Dr. Baker, Secretary of the State Board of Health, has proved by experiment with lamps, that an explosive mixture may form and the lamp may explode while the body of oil in the lamp is not above 85° F. The temperature of the body of oil in the lamp is not the only factor to be considered, because different parts of the lamp become very unequally heated. If you will touch the brass collar of a lamp which has been burning for some time, you will find it quite hot, and the tube supporting the wick is still more strongly heated. *The formation of vapor will be determined by the hottest part of the lamp which comes in contact with the oil.* When the combustion is imperfect from any cause, the brass fittings of the lamp become excessively heated. Dr. Baker found in his experiments, that when the chimney was removed, by breaking or otherwise, and the lamp continued to burn, the temperature of the brass collar rose very rapidly in every instance; in one case, in 14 minutes, it rose to 161° F., and in another case, in ten minutes, to 155° F. In this last instance very rapid explosions occurred by the side of the wick, and to prevent the whole lamp from exploding the light was extinguished. *In none of these experiments did the temperature of the body of the oil rise above 85° F.* Many

persons on leaving a room “*turn down the lamp,*” to save oil, but such economy is very liable to cause a lamp explosion, which is anything but economical. I know of a case in Charlotte which illustrates the danger of this practice: A lamp in a store was turned down during the absence of the clerk, a person passing saw the lamp explode, and by promptly breaking open the store he extinguished the fire. If a light is not needed in a room, either extinguish the lamp or leave it burning with the usual blaze.

METHODS OF INSPECTION.

Permit me to call your attention to the methods of inspecting oil, and to explain why such different results are reached by Michigan and Ohio inspection. Many persons are puzzled to know why oil that will pass Ohio inspection at 150° will only bear Michigan inspection at 120° or even 115°. The discrepancy is to be explained by the difference in construction and use of Michigan and Ohio oil-testers. In all oil-testers, so far as I know, the oil to be tested is heated in a water-bath, and the temperature of the oil is measured by a thermometer whose bulb is just covered by the oil. In these respects the oil-testers of both States agree. In the Ohio tester—what is called “the commercial test”—the oil fills the containing vessel brim-full, and there is no screen or covering to prevent the escape of the vapor as it forms; the least movement of the air tends to dissipate the vapor. Moreover the vapor of kerosene is more than twice as heavy as air, and when it forms it tends to fall down the sides of the vessel and will not accumulate in large quantity over the oil unless it forms quite rapidly, becoming heaped up on its surface. If a lighted splinter be passed rapidly over the oil half an inch, an inch or more above its surface, it may fail to ignite the vapor even when it is escaping freely from the oil. The distance above the oil at which the lighted splinter must be passed is left entirely to the judgment of the operator, and hence the results of inspection are largely within his control; if he wants it to pass a high test he has only to raise his lighted splinter higher above the surface of the oil, or dash it past the surface more rapidly.

In the Michigan tester, a sample of which is before you, these sources of error and uncertainty are avoided by a *vapor chamber* over the oil. This chamber is one inch deep, and is covered with a copper plate, so that the heavy vapors cannot escape. When a lighted match is passed into this vapor chamber, if vapor is present in sensible quantity, a flash will reveal its presence. *This vapor chamber represents the space inside a lamp which is not filled with oil.* An oil that will flash at a given temperature in this vapor chamber, will explode at the same temperature in a lamp if flame is applied, because the flash in the vapor chamber is an explosion. The flashing temperature of an oil in our tester represents the exploding temperature of the same oil in a lamp under favorable circumstances. To show more clearly this relation of the vapor chamber in our tester to the empty space in a partially filled lamp, Dr. Baker has constructed a water-bath and used this lamp (which has a side opening for filling the lamp) for an oil tester. If the lamp is partially filled with oil, a thermometer placed in the oil through this opening for the wick, the whole placed in this water-bath to heat it, and then a lighted match passed into the empty space of the lamp through this side aperture, we have all the conditions of our Michigan oil tester, and the oil may be tested in this apparatus the same as in our oil tester. You thus see that the empty space in this lamp represents the vapor chamber in our oil tester. We often speak of this part of the lamp as empty.

It is not empty, but is filled with a mixture of vapor of the oil and air, and if these are present in the right proportions, they will explode in the lamp the same as in the oil tester.

Since the Michigan tester prevents the escape of the vapor as it forms, and since the lighted splinter must be plunged into the space where the vapor is, our tester will mark a much lower temperature of inspection than will the Ohio tester. Oil that will bear our test of 140° will usually pass Ohio inspection at 175° . Our method of testing is much more accurate, the results are less within the control of the operator, and it bears an intimate relation to the actual conditions of a lamp while burning. It has reason and fitness, whatever the Ohio method has. Cleveland inspectors confessed that their method was too largely within the control of the inspector, but "the Michigan tester is the most accurate instrument yet invented,—you cannot make it vary more than a degree or two." When the oil-dealers rail at our "close tester," you must remember that its crying sins are that it is *accurate and unvarying, and that it indicates the limits of safety of oil when used in a lamp!*

PETITIONS FOR A CHANGE IN OUR LAW.

It is stated that a large number of petitions have been presented to the Legislature asking for a change in our law, and a reduction of the flash test to 120° . I well know how sacred you hold the right of petition, and how anxious you are to know what are the real wishes of the people of this State. But I fear that the people who are clamoring for this change have been misinformed and deceived by those who are pecuniarily interested in a change of our law. I am satisfied that the change demanded will not necessarily remove the evil complained of; that the reduction of our flash test, without some provision which shall exclude the large amount of paraffine oil which adulterates most of our "State oil," will still leave our people open to impositions of a most outrageous nature, which will lead them to demand a still greater reduction of our test; but if we shut out this paraffine adulteration, there will be no trouble about the quality of our oil. At the demand of the oil men, the test, two years ago, was reduced 10° ; but have we had any better oil for the change? It is worse than it was before the change.

I am satisfied that the oil men are at the bottom of this movement. The agents of the refiners are circulating printed forms of petitions in many parts of our State. Here is a printed form which the agent of the Standard Oil Co. was circulating in Jackson. I would like the committees on public health to compare this form with that of the petitions now in their hands and see if I am not correct in my suspicion that this "uprising of the people" has its headquarters in Cleveland. If the oil men have adulterated our kerosene beyond all endurance, have persuaded our people that such adulterated oil will not burn because of our high test, have printed and circulated among the people blank forms of petitions asking this reduction in our test, and by their misrepresentations have induced large numbers of our people to sign such petitions, like David of old you may well ask such petitioner, "Is not the hand of Joab with thee in all this?"

In the olden time a woman with sublime audacity appealed from Philip drunk to Philip sober. I appeal from the clamor of a people misinformed and misguided to the sober sense of this Legislature. Do what you feel will best subserve the public good, and your constituents will receive you with the plaudit, "Well done, good and faithful servants."

CHANGES IN THE PRESENT LAW.*

There are a few changes which seem to be desirable in our present law:

1. Abolish the fire test, but retain our present flash test of 140°.
2. Reject all oils which contain much paraffine; for example, all oils that do not remain clear and transparent when cooled down to 20° Fahr. for ten minutes.
3. Make it a misdemeanor for any person to use uninspected oil.
4. Make it a misdemeanor for any dealer to sell empty kerosene barrels or casks before canceling the inspection brand.
5. Make the dealer responsible for the acts of his clerks and employes in selling illuminating oil.
6. Make it the duty of the Governor to remove from office any State inspector who is unfaithful in the discharge of the duties of his office, and to appoint a competent person in his place.

In accordance with the recommendations in the foregoing lecture by Prof. Kedzie, the Committee on Public Health in the House of Representatives recommended the passage of a bill which was known as House bill No. 28, General Order No. 127.

The bill was amended, or rather changed, so that naphtha, etc., may be used in street lamps, and became a law as follows:

LAW RELATING TO ILLUMINATING OILS.

[No. 196, Laws of Mich., 1877.]

AN ACT to amend act number one hundred and eighty-one of the session laws of eighteen hundred and seventy-five, entitled "An act to provide for the inspection of illuminating oils, manufactured from petroleum or coal oils."

Act amended.

SECTION 1. *The People of the State of Michigan enact*, That act number one hundred and eighty-one of the session laws of eighteen hundred and seventy-five, being "An act to provide for the inspection of illuminating oils, manufactured from coal oils," approved May first, eighteen hundred and seventy-five, be amended so that the same shall be and read as follows:

State inspector
of oils, appoint-
ment of.

(276.) SECTION 1. *The People of the State of Michigan enact*, That the Governor shall appoint a suitable person, resident of the State, who is not interested in manufacturing, dealing or vending any illuminating oils manufactured from petroleum, as State inspector of oils, whose term of office shall be two years from the date of appointment, or until his successor shall be appointed and shall qualify. It shall be the duty of said State inspector or his deputies hereinafter provided, to examine and test the quality of all such oils offered for sale by any manufacturer, vender, or dealer, and if,

Term of office.

[*Most of these proposed changes have since been made, as will be seen from the amended law, printed herewith.—H. B. B., Sec'y S. B. of H.]

upon such testing or examination, the oils shall meet the requirements hereinafter specified, he shall fix his brand or device, viz.: Brand. "Approved," with the date over his official signature, upon the package, barrel, or cask containing the same, and it shall be lawful for any manufacturer, vender, or dealer to sell the same as an illuminator; but if the oil so tested shall not meet said requirements, he shall mark in plain letters on said package, cask, or barrel over his official signature, the words, "Rejected for illuminating purposes;" and it shall be unlawful for the owner thereof to sell such oil for illuminating purposes; and if any person shall sell, or offer for sale such rejected oil, he shall be deemed guilty of a misdemeanor, and shall be subject to a penalty in any sum not exceeding three hundred dollars. Unlawful to sell rejected oils. Penalty.

(277.) SEC. 2. The State inspector provided for in this act is hereby empowered to appoint a suitable number of deputies, which deputies are hereby empowered to perform the duties of inspection, and shall be liable to the same penalties as the State inspector: *Provided*, That the State inspector may remove any of said deputies for reasonable cause. It shall be the duty of the inspector and his deputies to provide themselves, at their own expense, with the necessary instruments and apparatus for testing the quality of said illuminating oils, and when called upon for that purpose, to promptly inspect all oils hereinbefore mentioned and to reject for illuminating purposes all oils which, by reason of being adulterated with paraffine oil or other substance, or for any other reason, will not remain colorless and transparent when cooled for ten minutes to the temperature of twenty degrees above zero of Fahrenheit's thermometer, or which will emit a combustible vapor at the temperature of one hundred and forty degrees of Fahrenheit's thermometer: *Provided*, The quantity of oil used in this last test shall not be less than half a pint. The oil tester adopted and recommended by the Michigan State Board of Health shall be used by the inspector and his deputies. Deputy Inspectors. Inspectors to provide themselves with instruments and inspect oils when called upon. Test. Oil tester.

(278.) SEC. 3. Every person appointed State inspector or deputy inspector shall, before he enters upon the discharge of the duties of his office, take an oath or affirmation, prescribed by the constitution and laws of this state, and shall file the same in the office of the Secretary of State. The State inspector shall execute a bond to the State of Michigan, in such sum and with such surety as shall be approved by the Secretary of State conditioned for the faithful performance of the duties imposed upon him by this act, which bond shall be for the use of all persons aggrieved by the acts or neglect of said inspector; and the same shall be filed with the Secretary of State. The deputy inspector shall execute a bond to the State of Michigan in such sum, and with such surety as shall be approved by the judge of probate, and file the same with the county clerk in the county where the deputy inspector resides. Said inspector or deputy inspector shall be entitled to demand and receive from the owner or party calling on him, or for whom he shall inspect, the sum of sixty cents for a single barrel, package, or cask, (and) forty cents each when not exceeding five in number; Oath of inspector and deputies. Bond of inspector. Bond of deputy. Fees for inspection.

- thirty cents each when not exceeding ten in number, and ten cents for each additional barrel, package, or cask actually inspected and branded by him in lots less than car loads, and for a car load of fifty barrels, packages or casks, ten cents for each barrel, package, or cask so inspected and branded by him, and in any case of inspection and branding, the fees shall be a lien on the oils so inspected, and it shall be the duty of every inspector or deputy inspector to keep a true and accurate record of all oils so inspected and branded by him, which record shall state the date of inspection and number of gallons or barrels, and the name of the person for whom inspected; and the record shall be open to the inspection of any and all persons interested. And it shall be the duty of every deputy inspector, within one month after the inspection by him of any oils hereinbefore mentioned, to make a true and accurate return thereof to his principal. In the month of January in each year the State inspector shall make and deliver to the Governor of the State an annual report of the inspections by himself and deputies during the preceding calendar year. All illuminating oils manufactured or refined in this State shall be inspected before removed from the manufactory or refinery. And if any person or persons, whether manufacturer, vender, or dealer, shall sell or attempt to sell to any person in this State, any illuminating oils, whether manufactured in this State or not, before having the same inspected as provided in this act, he shall be deemed guilty of a misdemeanor, and he shall be subject to a penalty in any sum not exceeding three hundred dollars; and if any manufacturer, vender, or dealer of either or any of said illuminating oils shall falsely brand the package, cask, or barrel containing the same, as provided in sections one and two of this act, or shall use packages, casks, or barrels having the inspector's brand thereon, without having the oil inspected, he shall be deemed guilty of a misdemeanor, and he shall be subject to a penalty in any sum not exceeding three hundred dollars, nor less than one hundred dollars, or be imprisoned in the county jail not exceeding six months, or both, at the discretion of the court.
- Record of oils inspected.**
- Deputies to report annually to principal.**
- State inspector to report to Governor.**
- Inspection of oils manufactured in this State.**
- Penalty for selling, etc., before inspection.**
- Penalty for branding falsely.**
- SEC. 4.** Any person who shall knowingly use in any lamp any illuminating oil or products of petroleum for illuminating purposes before the same has been inspected and accepted by the State inspector of oils or his deputy, shall be guilty of a misdemeanor, and, on conviction, shall pay a fine in any sum not exceeding ten dollars for each offense.
- Penalty for using oils not inspected.**
- SEC. 5.** Any person selling or dealing in illuminating oils produced from petroleum, who shall sell or dispose of any empty kerosene barrel, cask, or package, before thoroughly canceling, removing or effacing the inspection brand on the same, shall be guilty of a misdemeanor, and, on conviction, shall pay a fine of one dollar for each barrel, cask, or package thus sold or disposed of.
- Penalty for selling casks, etc., before removing brand.**
- (281.) SEC. 6.** No person shall adulterate, with paraffine or other substance for the purpose of sale or for use, any coal or kerosene oils to be used for lights, in such a manner as to render them dangerous to use; nor shall any person knowingly sell or offer to sell,
- No person to adulterate, sell, or use certain oils or their products.**

or knowingly use such adulterated oil, nor shall any person knowingly sell or offer for sale or knowingly use any coal or kerosene oil, or any of the products thereof for illuminating purposes, which, by reason of being adulterated, or for any other reason, will emit a combustible vapor at the temperature less than one hundred and forty degrees of Fahrenheit's thermometer: *Provided*, That the quantity used in the test shall not be less than one-half pint: *And further provided*, That the gas or vapor from said oils may be used for illuminating purposes when the oils from which said gas or vapor is generated are contained in reservoirs under ground outside the building illuminated or lighted by said gas. Any person violating the provisions of this section shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof, be punished by imprisonment in the county jail not more than one year, or by fine not exceeding four hundred dollars, or by both fine and imprisonment, in the discretion of the court: *Provided*, That nothing in this act shall be so construed as to prevent the use in street lamps of the lighter product of petroleum, such as gasoline, benzene, benzole, or naphtha.

Proviso.

Further proviso.

Penalty for violating provisions of this section.

Proviso.

SEC. 7. Any person or persons who sell or keep for sale any illuminating oil manufactured from petroleum, shall be held responsible for any violation of the provisions of this act by any clerk or person in their employ in the sale of said illuminating oil.

Seller of oils responsible for sales by clerk.

(279.) SEC. 8. It shall be the duty of the inspector, or any deputy inspector, who shall know of the violation of any of the provisions of sections one, three, four, five, or six of this act, to enter complaint before any court of competent jurisdiction against any persons so offending. And in case any inspector, or deputy inspector, having knowledge of the violation of the provisions of sections one, three, four, or six of this act, and shall neglect to enter complaint as required by and provided for in this section, he shall be deemed guilty of a misdemeanor.

Inspectors to make complaint for violation of provisions of this act.

Failure deemed misdemeanor.

(280.) SEC. 9. No inspector or deputy inspector shall, while in office, traffic directly or indirectly in any article which he is appointed to inspect. For the violation of any of the provisions of this act he shall be liable to the penalty not exceeding one thousand dollars.

Not to traffic in oils.

Penalty for violation of provisions of this act.

SEC. 10. It shall be the duty of the Governor to remove from office and to appoint a competent person in the place of any State inspector who is unfaithful in the duties of his office.

Governor to remove incompetent inspectors, and appoint their successors.

(282.) SEC. 11. All acts or parts of acts contravening the provisions of this act are hereby repealed.

Acts repealed.

Approved May 23, 1877.

THE
INSPECTION OF ILLUMINATING OILS
IN
MICHIGAN,

DURING THE YEAR ENDING JULY 31, 1877.

BY
PERRY AVERILL,

State Inspector of Illuminating Oils.

INSPECTION OF ILLUMINATING OILS IN MICHIGAN.

To the President and Members of the Michigan State Board of Health:

GENTLEMEN:—I received my appointment as State Inspector of illuminating oils Aug. 1, 1876, and at that time commenced the work. I immediately made application to my predecessor for all records pertaining to the inspection, but did not receive any except the names of the deputies and their several places of address. With the assistance of your Secretary, H. B. Baker, and F. W. Averill, deputy inspector, I was soon in possession of the system that had been adopted, which in the main I have followed. I have requested the dealers throughout the State to report to me any violation of the law, assuring them that they will not be known in any way in the matter. I have received but few complaints, and have not been able to get sufficient evidence to warrant prosecution except in three cases.

It seems to be the desire of the dealers throughout the State to comply with the law. I find it difficult to control some small shipments to the lumber woods and small places in the northern and western part of the State where parties purchase their oils in markets out of this State, although the same parties desire Michigan legal oil. I am not able to state the number of barrels used per annum, for reasons above given.

During the five months, August, September, October, November, and December, 1876, the whole number of barrels reported inspected was 29,171; of this number there were rejected 326.

The detailed report is as follows:

REPORT of Inspection of Illuminating Oils during the five months ending December 31, 1876.

WHERE INSPECTED.	BY WHOM INSPECTED.	No. of Barrels Rejected.	No. of Barrels Approved.	Whole No. of Barrels Inspected.	REMARKS.
Detroit	F. W. Averill	103	8,734	8,837	Reports from Aug. 15, 1876.
Grand Rapids	J. T. Elliott	12	3,416	3,428	“ “ “
Jackson	P. Averill	128	3,345	3,473	
East Saginaw	John Weller .....	.....	2,908	2,908	
Adrain	J. H. Blain	20	2,650	2,670	
Kalamazoo	H. G. Coleman	20	2,040	2,060	
Port Huron	E. H. Valentine	14	1,264	1,278	December not reported.
Lansing	V. R. Canfield	21	1,242	1,263	
Owosso	S. Burhans	2	1,030	1,032	
Ionian	S. Taylor .....	.....	755	755	December not reported.
St. Joseph	R. F. Stratton .....	.....	459	459	
Alpena	T. M. Luce .....	.....	225	225	
Niles	R. K. Charles .....	.....	160	160	December not reported.
Albion	H. W. Crittenden .....	.....	200	200	
Three Rivers	A. B. Ranney .....	.....	125	125	December not reported.
Hillsdale	G. H. Jordan .....	.....	75	75	“ “ “
Muskegon	A. M. Chamberlain	3	54	57	“ “ “
Ludington	B. Hammond .....	.....	30	30	“ “ “
Pentwater	G. W. Innes .....	.....	86	86	“ “ “
Manistee	D. D. Ingram	3	47	50	“ “ “
Marquette	A. Mathews .....	.....	.....	.....	Accepted the appointment as Deputy Inspector in November. No report.
		326	28,845	29,171	

From this I would say that the number used in Michigan would not vary much from 60,000 barrels per annum. There have been reported since August 1st only five fires attributed to explosion of kerosene, four of which have been investigated and the reports found incorrect; of the fifth, that of Morley, I have not yet learned the facts.

The Legislature will be petitioned to change the law relative to the inspection and standard of illuminating oils, lowering that standard if possible. I annex a copy of said petition, which has been extensively circulated throughout the State by the agents of the Standard Oil Company:

To the Honorable, the Legislature of the State of Michigan:

Your petitioners of.....dealers in and consumers of kerosene oil, while approving the general features of the law of the State, in regard to illuminating oils, are of the opinion that the standard should be reduced to, say 120° flash test. By this test the safety from accidents would be preserved, and the illuminating power of the oil improved, and the expense to the consumer decreased. We therefore ask that the present law be so amended as to conform to the above, and your petitioners will ever pray, &c.

I feel interested in what may be developed, as you probably are. The law as it stands at present is considered by those interested in the public safety as a wise and salutary measure, and its enforcement has placed upon the market and in the homes of our citizens an article that is used with a feeling of satisfaction and security. If the quality of the oil has in some instances been complained

of as a poor illuminator, it cannot justly be laid to the law; for a high fire test and a good illuminator can be made at the same time, if the refiners will do it. I say an advancement has been made from which all thoughtful minds must be led to say no retrograde step must be allowed that will tend to impair the safety of the public of our commonwealth in this respect.

PERRY AVERILL,
State Inspector.

JANUARY, 1877.

To the President and Members of the State Board of Health, of Michigan:

GENTLEMEN:—It is with pleasure that I comply with the request made at the meeting of your honorable board July 10, 1877, that I complete the statement for the entire year ending July 31, 1877. Since my report to you January 1, 1877, there have been inspected 30,732 barrels, making the total number inspected for the year ending July 31, 1877, 59,913 barrels. Of this number there have been rejected and shipped out of the State 668 barrels, some of which flashed as low as 76°. This low-test oil is invariably branded by the shippers as inspected and approved Michigan legal test 150°, and is shipped to dealers in small places remote from any inspector.

REPORT of the Number of Barrels of Oil Inspected in Michigan during the Year ending July 31, 1877.

WHERE INSPECTED.	BY WHOM INSPECTED.	Whole No. of Barrels Inspected.	Number of Barrels Rejected.	REMARKS.
Jackson	Perry Averill	7,736	131	.....
Detroit	F. W. Averill	15,900	125	Reports from August 15, 1876.
Grand Rapids	J. T. Elliott	6,928	16	“ “ “ 15, 1876.
East Saginaw	John Weller	5,786	161	.....
Adrian	J. H. Blain	4,877	23	.....
Kalamazoo	H. G. Colman	3,913	38	.....
Port Huron	E. H. Valentine	2,554	14	.....
LaSang	V. R. Canfield	2,358	76	.....
Ionia	L. B. Avery	2,030	.....	.....
Owosso	S. Burhans	1,813	2	.....
Marquette	A. Mathews	1,175	113	Reports from Nov. 1, 1876.
Muskegon	A. W. Chamberlain	682	15	.....
St. Joseph	R. F. Stratton	591	6	.....
Hillsdale	G. H. Jordan	875	.....	.....
Niles	R. K. Charles	401	.....	June and July not reported.
Albion	H. W. Crittenden	500	.....	.....
Three Rivers	A. B. Ranney	477	.....	.....
Alpena	T. M. Luce	322	.....	.....
Allegan	R. Pratt	269	.....	.....
Grand Haven	C. J. Pfaff	199	.....	.....
Manistee	D. D. Ingram	150	.....	.....
Pentwater	G. W. Innes	86	.....	.....
Ludington	B. Hammond	187	3	.....
Big Rapids	A. S. Hobart	104	.....	.....
White Hall	R. F. Morse .....	.....	.....	No report.
Saugatuck	R. Newnham .....	.....	.....	“ “
Elk Rapids	R. Landon .....	.....	.....	“ “
South Haven	H. E. Dewey .....	.....	.....	“ “
Traverse City	Dr. Ashton .....	.....	.....	.....
Total Inspected .....	.....	59,913	668	.....

A full report would increase the number to over 60,000 barrels.

There has been a great change in the quality of oil used since Professor Kedzie's lecture before the members of the late Legislature explaining the cause why so much of the oil was a poor illuminator. Two-thirds of the oil now used is "water-white," while before it was of a straw color (or oils adulterated with paraffine). It is with satisfaction that I can say not a human life has been lost in the use of illuminating oils. There have been two fires caused by explosion of oils manufactured from petroleum; in each case the oil was not Michigan legal test. The first, in March, was a barn belonging to Riley Billings, of Delta township. Besides the barn some fifteen head of cattle were burned. The fire was caused by an explosion of a kerosene lantern. The oil used by Mr. Billings was inspected by V. R. Canfield, deputy inspector, and rejected, as it flashed at 130°. The barrel was originally branded as fire test 175°, and was from Chicago. Mr. Canfield says that the dealer from whom the oil was purchased by Mr. Billings returned the unsold oil, after he rejected it, to the shipper before the fire occurred. The second was in July, at Wayne. Mr. E. P. Earl purchased naphtha, which was sold to him for mechanical purposes, and in direct violation of the law used it for illuminating purpose. The results were his lamp exploded, his dwelling was destroyed, and he seriously burnt.

You well know what pressure was brought to bear by the oil men and refiners to get the test reduced in this State. The citizens of this commonwealth are to be congratulated that, through the untiring efforts and results shown from actual experiments by members of your board, the test was retained at the present standard, which ensures to them a safe and good illuminator.

I remain very respectfully your obedient servant,

PERRY AVERILL,
State Inspector Illuminating Oils.

JACKSON, MICH., August 7, 1877.

REPORT OF PROCEEDINGS
OF THE
HEALTH DEPARTMENT
OF THE
AMERICAN SOCIAL SCIENCE ASSOCIATION,

At its Annual Meeting at Saratoga, N. Y., September, 1877.

BY
HON. LEROY PARKER,
MEMBER OF THE
STATE BOARD OF HEALTH,
MEMBER OF THE AMERICAN SOCIAL SCIENCE ASSOCIATION, ETC.

REPORT

OF PROCEEDINGS OF THE DEPARTMENT OF HEALTH OF THE AMERICAN SOCIAL SCIENCE ASSOCIATION, AT ITS ANNUAL MEETING,
HELD AT SARATOGA SPRINGS, SEPTEMBER, 1877.

To the President and Members of the State Board of Health :

GENTLEMEN :—Through your courtesy, at the last meeting of the Board, I was invited to attend the annual meeting of the American Social Science Association, which was held at Saratoga Springs on the 4th, 5th, 6th, and 7th of September, 1877, and report to you the proceedings of that meeting. I presume that it was intended that my report should embrace only those transactions having reference to the subject of public health and its preservation, and particularly the subjects treated of in the papers and discussions before the Health Department of the Association.

The general meetings of the Association were quite largely attended, and the number of persons present and participating, who have distinguished themselves by their labors in the field of social science, was particularly noticeable. It is matter for congratulation, that so many statesmen, scientists, political economists, thinkers and writers upon the topics of interest in our social and political life, should have been present, and contributed so much of their best thoughts to the solution of the problems which society is trying to work out. From the prominence given to questions of political economy, and those relating to public charities, in the meetings of the Association, and from the general interest excited by the papers and discussions upon these topics, it is manifest that the public mind is more interested in matters pertaining to financial and social well-being than in those concerning public health. This is perhaps not to be wondered at, when we consider how generally mankind devotes itself to advancing material interests, to the neglect of, and I may say, often at the expense of its physical condition.

The meetings of the Health Department, although not numerously attended, were of considerable interest to those present.

The report of the Secretary, Dr. D. F. Lincoln of Boston, Mass., congratulated the members on the accomplishment of a large part of their plan in school hygiene. As part of the work undertaken during the year, a draft of a bill was presented to the Legislature of Massachusetts, abolishing the office of coroner and coroner's juries, and remodeling the procedure, and providing for medical examiners to perform the duties of coroners, who shall be men learned in the science of medicine. The desired reform has been carried through, substantially as indicated in this draft. The interests of school hygiene have been

actively supported in Boston by representations made at a hearing, before the school committee, on the appointment of a medical inspector of public schools.

The hygienic question whether young women in schools ought to suspend their studies at periodical intervals, has been treated in a valuable essay by Dr. Mary Putnam Jacobi. The essay concludes that woman's periods of repose should come very frequently, rather once in the middle of each day than once a month.

Work of importance has been done by Dr. Loring of New York, in reply to questions on the influences of bad air, etc., upon the eyes, addressed to him by the New York Medico-Legal Society. A commendable interest in the state of schools in this respect has been shown by a few persons,—Dr. Bell and others in Brooklyn, and Drs. Lathrop and Howe in Buffalo. Dr. Bell points out a very reprehensible state of things in his city. Dr. Howe has examined the eyes of 1,003 pupils, and has found a confirmation of the law that near sight accompanies scholastic labor in a given proportion of cases.

Of the results of the International Exhibition of last year, as regards the principles of school hygiene, little is to be said. Dr. Lincoln made an especial study of the various plans for school buildings exhibited. The Belgian School House was by far the most valuable exhibition of this sort. A few school plans were striking, many were good, but none very new. The American school furniture was well made, on good principles.

A paper read by Dr. E. G. Loring, of New York, upon the subject: "Is the intellectual world becoming near-sighted?" was a continuation of the same subject discussed in a paper read before the Association at the meeting last year. His paper was illustrated by charts showing the percentage of near-sighted eyes in a large number of pupils examined in the public schools in New York. The conclusion drawn was that studious habits were conducive to near-sightedness. The children of German parentage are more generally near-sighted than those of other nationalities. Careful observation had shown that near-sightedness was hereditary, and that a scholarly race of people transmitted this disease of the eye, very generally, to their offspring.

An interesting paper on School Ventilation was read by Mr. A. C. Martin, of Boston, illustrated by drawings of school buildings in the city of Boston, ventilated by what was termed the natural system. He advocated a system of ventilation of school buildings by means of a vertical shaft running from the basement to the open air above the roof, connecting by floor registers with the different rooms, by means of horizontal ducts. In the discussion which followed this paper, Carl Pfeiffer, an architect of the city of New York, gave as his experience that the natural method of ventilation failed when applied to very large buildings, such as hospitals, alms houses, and the like, and that artificial means must be employed, by means of fans, to draw or force air in or out of the rooms. The question whether floor or ceiling ventilating openings were best, was discussed, and the opinion was held by several gentlemen present that both were desirable, as, under certain conditions, the foul air collected sometimes at the top of a room, and sometimes at the bottom.

Two papers upon the same subject, one by Dr. Frederick Winsor, and the other by Frederick Tudor, of Boston, were read. The latter called attention to the influence of changes in temperature upon the regularity of the supply of fresh air, and the failure of ventilating apparatus is shown to be often owing to unexpected force exerted by high winds. The movement of air in the flues is determined by very slight forces, requiring great care in balancing

the various columns of air against each other, and in protecting them from the influence of the wind. Theoretical information in regard to the subject is not sufficient to insure a successful design. Discredit has been thrown upon the art of ventilation, by want of thorough knowledge, practical familiarity, and long experience. It is of great importance to have the fewest possible inlets and outlets for the air; to reduce these to one of each where it can be done;* and to provide simple means of regulating the velocity of movement, with a pressure meter, showing constantly the rate of supply, or volume of air delivered per minute. Neglect to provide an arrangement for adjusting the temperature is a leading fault of all schemes. It can easily be done, and should on no account be omitted.

The consideration of the quality of the air supplied in ventilation, introduced a discussion of the merits of the various modes of heating. As between furnaces of cast and wrought iron, it is held that while the latter is a better material, the practical difficulties in the way of constructing good furnaces of it cheaply, are a bar to its general adoption, at least while the attempt is made by manufacturers to compete with cast iron. In short, a superior furnace of cast iron is preferable to the inferior, cheap wrought iron furnaces now being rapidly adopted. To avoid the injurious quality of air which has been overheated, care must be taken to secure great extension of the heating surface. This can best be secured by hot water apparatus, next by steam, and finally by furnaces, if they are very large and the combustion of the fuel very slow. For all small buildings the furnace is most suitable, on the ground of economy and simplicity of management. A property of the atmosphere not sufficiently considered hitherto, is its humidity under all natural conditions. A full explanation was given, by the writer, of the variations of this quality effected by artificial heating; and the absence of moisture at a high temperature was shown to be a sufficient cause for derangement of the system. The inference is that no system of ventilation is complete without apparatus to supply vapor in proportion as the temperature is raised, so that the relative humidity shall not fall below the limits observed in natural air, to which our organism is adapted.

The paper read by Mrs. A. C. Martin, of Boston, on the subject, "The danger to the health of girls from imperfect early training," is briefly summarized as follows:

Food, dress, dissipation, overwork, or excessive stimulus, have all been much discussed as causes for breakdown in the health of girls, yet there remain not a few cases of failure not accounted for. Eager, ambitious girls of sixteen, who ought to be the first scholars, frequently fail in their best endeavors; they become fretted and worried, and if there be not permanent injury to health, nerves and temper are never again quite in tune. Such girls have had no early training. When they have become conscious of a world of books and of

* This may be true so far as relates to facility of testing the velocity and rate of the supply of fresh air, and of the exit of foul air; but by the members of this Board who have given special study to this subject, it is not believed to be the proper principle of action. In the First Annual Report of the Michigan State Board of Health, on page 90, Prof. Kedzie says: "The accidental experiment which I performed in a school in Kalamazoo, of gathering the air for analysis during recess, while the scholars stood around me in a dense throng to witness the operation, this air containing a large excess of carbonic acid, shows the necessity of withdrawing the air from those portions of the room where the scholars most congregate." * * * "It should be withdrawn at many points in the body of the room, by openings into foul-air ducts beneath the floor." In addition to the experimental evidence at Kalamazoo, just mentioned, he states as the theoretical reason for this, the fact that "The law of diffusion, by which every gas acts as a vacuum to every other gas, is a scientific truth, but it acts slowly with heavy gases, the rapidity of diffusion being inversely as the square root of the density of the gas."

thought, when the inward motive to study has been suddenly awakened, they find themselves with no trained powers, no attention, no reason, no memory. Ambitious to follow more fortunate companions, they inflict upon themselves lasting harm in the struggle, or drop, bitterly disappointed, by the wayside.

This want of early training is not simply from want of opportunity; for the classes in society who have the amplest opportunities are the most neglectful. The boys are provided for by the fathers, but the girls are left to the mothers, who are ignorant and short-sighted and who, above all, dislike to take trouble. Little girls are left to run wild, on the plea of health, when in reality it is because the mothers will not take pains with them. Mothers who object most to study at home, are perfectly willing to have it when the girl has grown so fond of her books that she will make no trouble.

The cause of all this is to be found in the prevailing sentiment of society, the *laissez aller* feeling, which is induced by rapidly acquired wealth. Not much improvement can be expected except in the slow renewal of society itself. The one session, the long vacations, the continual absences from school make the formation of habits of study or of thought impossible. Shorter school hours and longer terms, less study per day, and more days of study, are what young girls ought to have.

Only the parents can do any good in this matter. The physician can seldom discriminate remote predetermining causes. Even if he could, it is too late. The teachers are powerless. Parental caprice and fickleness, and public opinion in favor of easy living, are all against the teachers.

The fathers must assume the oversight of the education of their daughters as well as of their sons. Even if not liberally educated men, they are more likely than the mothers to be far-sighted—less ready to sacrifice the future to the present.

Dr. D. F. Lincoln, of Boston, the Secretary of the Health Department, read a paper on "The half-time system in Education." He said: The expression, "half-time system," is employed to designate a plan for educating children of the laboring classes by sending them to school for three hours each day, and letting them work in factories, in shops, or on farms for the rest of the working hours. The plan is modified in a few cases by allowing them to attend school for the full time, and to work on full time on alternate days; but in most cases the former method has been adopted. With our system of schools, and with our natural satisfaction in them, it is quite possible that we may have failed to make some necessary, even radical changes. Unperceived by us, fundamental changes may, at this moment, be quietly taking place.

There is a strong tendency now to withdraw children from public schools, for the purpose of caring for their religious interests, and there is another tendency to the formation of private schools where high prices are paid; the creation of private schools for factory children may constitute an influence leading in the same direction, namely, to the creation of distinct classes, educated by distinct methods, and thus marked from their youth as poor or rich, as Catholic, Protestant, or Jewish. This is the chief and central difficulty. But the children of the poor must be educated at all events. If separate schools for working children are to be condemned, the alternative which naturally occurs to us is the prohibition of manual labor in workshops or factories by children under the age of 15 years, and compulsory attendance on ordinary schools. The present law of Massachusetts, in fact, does forbid such labor by children under ten years of age, and requires twenty weeks of schooling or of half-time schooling for

children at work, between the ages of ten and fourteen years. It is a remarkable fact that in a great many instances the half-time children working in the same schools with full timers, are known to accomplish as much work and make as much progress. The following points were submitted as deserving of support:

1. Children under thirteen years cannot profitably study more than half as long a time as grown men and women.
2. The most profitable arrangement of school work for such children will restrict their study in general to three hours for the younger, and four and a half hours for the older, daily.
3. Compulsory laws fixing the period of attendance at not less than half of each year in the ordinary schools, or the whole of each year in any existing half-time school, are a present desideratum.
4. The State should enforce these laws by its own officers.
5. Where there are masses of the poor and the streets are full of corrupting influences, it is desirable to furnish occupation to the children both forenoon and afternoon. This may be done either by giving two short sessions of school, or by a full session in the forenoon and industrial teaching in the afternoon, or by a half-time system when feasible.

The foregoing comprise abstracts of the papers read before the health section of the Association.

I append an abstract of a paper read before the general session of the Association by Dr. Elisha Harris, on "The Registration of Vital Statistics in the United States." As this subject is one intimately connected with the work of Boards of Health, it will undoubtedly be of interest:

The census enumerations of the population ought to be absolutely accurate and complete; but the method of enumeration is so essentially faulty that as respects the poll of the living inhabitants, even the total columns are equivocal, while all the distributive grouping is untrustworthy. The essential viciousness of each successive census will remain unremedied until the methods of enumeration are made exact; until all the facts relating to births, marriages, and deaths, and the causes of death, are currently registered as public records in every county and State. Vital statistics comprise the account current of the State with the lives of the inhabitants. The registration of these statistics is a duty rendered to the State, and is to be maintained by ways and means which the States alone can provide. But wherever a State has so provided the methods and means for the performance of the duties of vital registration, the people must comply with alacrity to the requirements of the registry laws. Birth records should be so complete as to establish and perpetuate the identity of individuals, and such other facts should be secured in respect to both the child and its parents as the law may require. Vital statisticians are already fully agreed on the elements of good birth records. The claim, both of the State and the infant, as to the record of its birth, is imperative, and allows no optional delay beyond the reasonable time necessary for certifying and filing the record for public registration. Claiming such a right, the State cannot do less than define the duties and obligations it imposes on the several persons interested, who cannot justifiably postpone the certification of a complete and detailed record. In cases of illegitimate children, as much information as possible should be obtained, particularly as to the occupation and nationality of each parent. Such records, made with faithfulness, will subserve the interests of statistical and biographical science. Faithful registration of stillbirths should be secured by judicious laws, regulating official returns and the suitable interment of remains. The interests of morality, as well as of science, demand this record. All records of marriages should be registered as soon as verified. The law submitted is in harmony with the statutes of Massachusetts, Connecticut, Rhode Island, and Illinois. Amendments of existing statutes may be readily effected in the States which need merely to give harmony and efficiency to existing laws, while in States which have only cumbrous and inefficient statutes relating to marriage registration, the adoption of an entirely new system under new

laws will be more practicable than amendments. The epitomized anthropological history of a life, a faithful certificate concerning time, place, and social conditions of each death scene, and medical facts in regard to causes of death, will ever impart to records all the real importance which family, State, and officers of health will justly claim. All events and causes of mortality are to be followed back until the question may be answered, "How may human life henceforth be more completely guarded against the causes of sickness, injury, and premature death?"

As it is the chief object of this report to suggest the arguments and the plan by which uniformity and completeness shall be given to the registration of vital statistics, we shall proceed directly to this purpose in all we submit in regard to records and registration. Certain essential conditions should be kept in view in devising the plan of the greatest practical utility and completeness in the records. These may be enumerated as a complete registration of births in every community; complete registration of marriage, the records of which shall be comprehensive. This branch of registry provides a basis of correct information concerning the foundation of families. The statute should provide for thorough and scientific verification of violent and unknown causes and circumstances of death, and effectual provision for specially verifying the fact, and the attendant circumstances of deaths. The entire matter of records and registration of mortality should be placed under the supervision of expert sanitary officers or boards of health.

At the conclusion of the reading of this paper, a committee consisting of Dr. Harris and Dr. H. B. Baker, the Secretary of our Board of Health, was appointed to confer with others with a view to devise a more perfect and general system of collecting vital statistics. I cannot close this report without referring to the many complimentary allusions made during the discussions before the Association, and by gentlemen to me privately, to the excellent work done by the Michigan State Board of Health, and particularly by the Secretary of the Board in his capacity as Superintendent of Vital Statistics.

REMARKS ON
INFANT DIET,

BY

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Grand Rapids, Michigan,

LATELY A MEMBER OF THE

STATE BOARD OF HEALTH.

REMARKS ON INFANT DIET.

“A sound mind” can exist only in “a sound body.” A sound body can exist only when the conditions of soundness (or health) are easily obtainable. The diet of infancy then, is important, 1st, because food is a necessity of existence; and, 2d, because the proper conditions of an infant’s diet are among the chief causes which make or mar a healthful state of existence in the future.

Nature has admirably provided a supply of the best form of food for infancy, when the mother is in a condition of health. Civilization, however, has by its many interferences with naturalness in the life of man, so altered the manner of his living, that not infrequently health is more or less interfered with; and as a consequence, the sustenance of a child by its mother is jeopardized, or prevented, or requires some caution to avoid ill results following.

We assume, then, at the outset, that every mother should, unless some cause incompatible with the health of the child prevent, suckle her own offspring. The exceptions to this rule should be well considered and not hastily acted upon; the counsel of a trusty family physician is, under such circumstances, invaluable. The most common fault with nursing mothers is a too frequent feeding of the infant. An infant, if uncomfortable from any cause,—too hot or too cold, clothing too tight, or pricked by pins,—will cry out, and take the breast if offered, just as it will when suffering from some ailment which gives it pain. A child that is fretful and desires to be nursed very frequently, should be examined for causes that may make it uncomfortable.

But to have an understanding of the whys and wherefores of baby’s food, it is essential to understand what food is, and what baby is.

And first, what is baby? Although we may consider our special baby the sweetest and most lovable creature in existence, physically, he or she is merely an animal, requiring a large amount of care, and a special food for its wants. At first it is toothless and without saliva,—it cannot then use any food but what is already prepared for the stomach,—and as the stomach is in early life small, and compared to that of adult life, tilted up on end, the quantity of food at one time must be small, and of such a character that the juices of the stomach can readily act upon it and prepare it for absorption by the proper glands of the intestines. Human babies, too, are longer than most other animals in growing to an age of capability for caring for themselves, or for elaborating from crude materials a supply of nourishment; after teeth do begin to show themselves, the first are merely incisors unable to attack any hard substance,—the molars or grinders are much later in putting in an appearance,

and altogether the first teeth are evidently intended not for a capable animal, but one for whom the food is somewhat prepared.

The act of digestion may be considered in three parts: 1st, that performed in the mouth by the teeth and saliva; 2d, that in the stomach by the secretions and motion in that viscus; and 3d, the finishing process in the intestine, aided by the secretions from the liver and pancreas, or sweetbread, as it is called in edible animals.

In the mouth, the infant differs from the adult by the absence of teeth, and, in the first few months, of saliva; consequently, the changes which are made in starchy food by these agencies, viz.: the trituration of grains, and the elaboration of starch into sugar by the action of ptyaline (having the same chemical action as diastase) in the saliva, are not possible; and therefore starchy food is inadmissible until teeth and saliva are ready in the mouth to care for them.

The stomach of an adult is large, lying across the abdomen, and with its one end pouch-like in shape, so as to be capable of holding a considerable quantity, and with a large flow of gastric juice containing a substance called pepsine, whereby the albuminous portions of the food are gradually formed into an emulsion, ready for the final action of the intestinal juices.

The infant's stomach is small, almost as large at one end as the other, and placed nearly upright in the body, rendering it unable to hold a large quantity or to work upon the albuminous portion of the food, if mixed with much of other substances not readily assimilable.

The intestinal juices and the bile serve to finish the processes so far elaborated, to select such portions of food as are useful, and to preserve the other portions for a time from decomposition until they can be eliminated. The pancreatic juice finishes the action begun by the saliva on starchy food, and the fluid elaborated by all these processes is absorbed into vessels which convey it to the blood. In the infantile intestines the pancreatic juice is absent or in small quantity compared to the others; therefore starchy food meets with but little favor in the earlier portion of our existence.

Foods are classified into flesh-formers and heat-producers, or nitrogenous and carbonaceous. Both are essential to our well being. No action of our muscles, or thought of our minds can be performed without using up the constituents of our bodies, which must be replaced through the food we consume; and as the atmosphere within which we live and move and have our being, is usually colder than the natural heat of our bodies, a fuel must be supplied to make up for the constant radiation of heat. This is supplied by our food; the quantity required varies with the changes of season, but is at all times a necessity.

The flesh-forming foods we find readily in those derived from the animal creation, as the flesh of animals, egg, cheese, and milk; also in the cereals in the gluten of wheat and other grains, and the leguminose of peas and beans. The heat-producing foods we find in fats, either animal or vegetable, in sugar and starch. This latter article is always, in the animal economy, converted into sugar before it is rendered available for the purposes of our nutrition.

In addition to these substances, several minerals are required to build up and maintain the bony fabric, and to enable the necessary changes to take place in the other portions of our bodies. The mineral substances are available, for the most part, in complex combinations, known in chemical language as salts, among which are compounds of lime, phosphorus, sodium, chlorine, etc., etc.

Having, in a few words, stated the requirements of the food, and the imma-

ture condition of baby's digestive apparatus, we cannot fail to appreciate at once, when we study into the make-up of milk, its beautiful adaptation to the wants of the infantile animal.

COMPOSITION OF WOMAN'S MILK AND MILK OF DIFFERENT ANIMALS.

	Ass's Milk.	Woman's Milk.	Cow's Milk.	Goat's Milk.	Ewe's Milk.
Caseine.....	1.82	1.52	4.48	4.02	4.50
Butter.....	1.11	3.55	3.13	3.32	4.20
Sugar of Milk.....	6.08	6.50	4.77	5.28	5.00
Various Salts.....	0.34	0.45	0.60	0.58	0.68
Total solids.....	9.35	12.02	12.98	13.20	14.38
Water.....	90.65	87.98	87.02	86.80	85.62
Total.....	100.00	100.00	100.00	100.00	100.00

This complex substance really consists of an emulsion, containing all that is necessary for the sustenance, growth, and repair of the animal for which it is provided; and in such a readily adaptable form as to require but a minimum of digestive effort before being absorbed, and converted into good blood, which is but the purveyor of all essentials to the minute subdivisions of our bodies; or, in other words, is the common carrier of good towards the parts that need renovation, and removes the effete or non-usable portions away from parts when this duty is required.

Its caseine is the flesh-former, its butter and sugar the heat-producer, and the salts the attendants upon other changes, and supporters of the bony fabric.

Upon the proper relation, too, of these different component parts depends its adaptability to the needs of the infant. An excess of caseine, as in cow's milk, causes a loading of the stomach with curds, which the peculiar position of the stomach renders it easy to eject, after a reasonable time has shown the impossibility of its digestion. An excess of butter beyond the ability of the juices to digest, and form into an emulsion, soon becomes rancid, developing fatty acids, which in return solidify the albuminous portions, rendering them so compact as to be indigestible. The health of the mother must be such as to render her capable of elaborating a sufficient quantity and quality of milk, or else her infant becomes a sufferer.

This result can best be accomplished by regularity of meals, sleep, and exercise, and with a diet varied to the taste, and not interfered with by occasional excesses; fruits and vegetables in their season, used in moderation, will not jeopardize the infant's health as much as a constrained dietary, with only a relief at intervals from its monotony.

To sketch in brief the proper management of an infant, as regards food, we should require the mother to nurse it herself, giving it for the first six months no other food whatever; for the first month or two, nursing it every two hours, and gradually extending the time until at six months the interval would be five hours; this is necessary to give the stomach a rest after each meal, whereby it can elaborate energy sufficient for the next meal to be promptly disposed of. After baby is six months old, it may be and often is necessary to supplement the mother's milk with some additional food, and as baby is yet toothless, we must provide a sustenance as near as possible in its digestibility to milk, as we have seen that compounds containing starch are inadmissible. Good cow's milk diluted with a little barley water, and to which some white sugar is added, answers a good purpose; should baby be constipated, oat meal should be used in preference to barley; occasionally the juice of flesh may be given,

or the flesh of fresh fish well cooked, or raw oysters. As the child grows in age and strength, these may be supplemented with gluten and milk; this may be prepared by boiling some good wheat flour in plenty of water, the flour tied tightly in a cloth or bag; after it becomes hard it should be grated and made into a pap with water, and fed with sugar and milk added; or a crust of bread may be allowed for the child to suck. After the child is a year old and, as frequently happens, has to be weaned, reliance must be placed on cow's milk, bread, and flesh simply cooked; a little fruit such as the pulp of apples, pears, and peaches, may be added; but the small fruits are objectionable from the irritation produced by their seeds. After two years of age the child should continue the same kind of diet, but may be allowed vegetables and light puddings in moderation.

Whenever, however, necessity compels a resort to hand-feeding for the nourishment of infants, without any assistance from the mother's milk, more caution is required to assure a food capable of being digested by the infant's stomach. Reliance must still be placed on the same class of foods as above mentioned; but in the first few months of an infant's life the food must very nearly resemble mother's milk, to meet with entire satisfaction as a nourisher of the infant, and yet not to cause disturbance in the digestive organs.

With this object in view, Dr. Liebig has recommended a food which in many cases fulfills the indications, and probably would do so more frequently, provided, more efficient carefulness be expended in its preparation. His formula is as follows:

Mix one ounce of wheaten flour with 10 ounces of milk, boil for 3 or 4 minutes, remove from the fire and allow to cool to 90° temperature. One ounce of malt powder mixed with 15 grains of bicarbonate of potash and 2 ounces of water are then to be stirred into it; the vessel must then be covered and allowed to stand for an hour and a half at a temperature of about 100 degrees. It is then put once more on the fire and gently boiled for a few minutes. Lastly it must be carefully strained to remove any particle of husk—then it is fit for the child's food. The effect of the malt is to transform the starch of the flour into glucose (sugar), thus the mixture gets thinner and sweeter as it stands. The potash is added to facilitate the changes and to neutralize acid in the flour and malt.

No artificial food, however, fulfills the office of mother's milk so entirely as not to become distasteful after a while. The monotony of its use becomes necessary to be interrupted by something else. With this in view, good cow's milk may be diluted with water in varying proportions,—commencing for the new born babe with equal parts of milk and water, to which add lime water in the proportion of one tablespoonful to a gill of prepared food, and gradually lessening the quantity of water added as the child grows older; a sufficient quantity of pure white sugar should be added to give it a perceptibly sweet taste but not syrupy. The occasional use of gum water, barley or oatmeal gruel, made very thin and without sugar and afterwards strained, is to be commended.

Nursing bottles are very much to be preferred to spoons or cups; the act of sucking is in itself an exciter of the digestive fluids, causing the saliva to exude into the mouth to be mixed with the food, and prevents a too hasty manner of feeding as well as prevents any lumps or insufficiently prepared food from being taken into the stomach.

The nursing bottle when not in use should be kept in water, after having been thoroughly cleansed in water to which a little soda or borax has been added.

SMALL-POX IN THE CITY OF DETROIT.

A COMMUNICATION

Read to the State Board of Health July 10, 1877,

FROM

HENRY F. LYSTER, M. D.,

MEMBER OF THE

STATE BOARD OF HEALTH.

SMALL-POX IN THE CITY OF DETROIT, AND THE RESTRICTION AND PREVENTION OF THE DISEASE.

To the Secretary of the State Board of Health :

DEAR SIR,—I respectfully report that the small-pox has been present in the city of Detroit during the whole of the past twelve months.

Though it has at no time prevailed as an epidemic, yet it has constantly appeared in a larger number of patients than should have been permitted had the proper authorities attended to its removal. I herewith submit a record of the actual number of cases and deaths occurring from this preventable disease :

July 5. The president of the Board of Health reported that none existed.

	No. of cases reported.	Deaths.
1876. July	5	6
“ August	2	3
“ September	4	3
“ October	2	3
“ November	12	4
“ December	23	17
1877. January	43	28
“ February	29	14
“ March	46	10
“ April	45	10
“ May	41	19
“ June	26	16
	<hr/> 278	<hr/> 133

The facts herewith presented to you reflect strongly upon the want of efficiency of the authorities of the city, and show that a disease which, as here presented, records a mortality of over 40 per cent, has been allowed to continue in the community for a period of at least one year. The attention of the authorities has at last been directed so strongly to its prevention that an appropriation of \$2,000 has been made for the purpose of furnishing vaccination to all who cannot pay for it; and the six city physicians, with a sufficient number of medical practitioners as assistants, have been directed to visit each and every family in their several districts, and vaccinate such persons as may not have been protected by recent vaccination.

There is no doubt but that if this ordinance of the council is properly and efficiently carried out, as, from the reports of those engaged in the work of vaccination, we have reason to believe it will be, this disease will very speedily disappear from within the city limits for the time being, excepting the few cases

imported from other places, which nothing short of the general vaccination of the race will prevent appearing in any of the larger cities, particularly in those situated upon the lines of through travel.

[The above report was presented to the State Board of Health at the meeting July 10, 1877.

At the present date, January 8, 1878, I am enabled to give some of the results of the very efficient general vaccination afforded by the Common Council. The table of cases and deaths has been continued, from that given above, through the last six months of the year:

	Cases.	Deaths.
1877. July	17	6
“ August	3	2
“ September	0	1
“ October	1	0
“ November	0	0
“ December	0	0
	21	9

During July and August 16,061 persons were vaccinated by the city, at an expense of \$4,015.25.* There has been but one case reported during the past four months. To any one familiar with the history of this disease, the sudden abatement of its prevalence during August, immediately subsequent to the general vaccination, will not be regarded as a mere coincidence, or as due to the elevation of the temperature. Any theory accounting for the complete disappearance of small-pox in this instance, other than as a consequence of vaccination, would hardly be tenable.—H. F. L.]

The lesson taught by the presence of this very serious form of disease in our midst has been an expensive one to the material interests of the city, not only on account of the expense to which the corporation has been in caring for those who came upon it for assistance, who were by far the larger number; in paying for the infected clothing ordered burned, and for the interment of those who died, but also in the loss of trade resulting from the exaggerated reports of the prevalence of the disease, preventing customers from coming into the city and diverting them to other markets.

The question naturally comes up at this time as to the best methods to be adopted to prevent the small-pox, and to avoid the agitation of this subject, by the people, every now and then, when a case is reported.

We have found by experience that compulsory laws are not generally carried into effect in this country; and while our legislators are capable of framing most excellent laws, in keeping with the scientific knowledge of the age, and sufficiently armored to withstand the judicial shafts of the Supreme Court, yet the theory of popular sovereignty is powerful to prevent their execution, and in consequence they are not enforced, except in rare instances and then at great expense. Although the people are not easily driven, they may be convinced by enlightened observation and reasoning; and if the subject of general vaccination is brought to their attention in a manner which appeals to their intelligent understanding, they will be disposed to adopt it.

By a process of exclusion, we have full power and authority to prevent the admission of children not vaccinated to the public schools in the State. This authority has been rigidly enforced in this city, and the consequence is

* It is supposed that fully as many more persons were vaccinated by their physicians during this period.

that not one of our 12,000 school children has had this disease during the past year. The force of this example has been generally felt, and a very large proportion of the children who are not attending the schools have been vaccinated, for the reason that their brothers and sisters who go to the schools have been obliged to be vaccinated. But this system of exclusion, which now alone applies to the public schools, and the army and navy, should, to be effective, be very generally applied to workshops, manufactories, railroad companies, merchant marine, etc., etc.; though here it would only apply to adults, who are naturally much less liable than children to this disease.

It is quite apparent to those who have given the subject attention, that the only feasible way in this country to keep the people protected, is to have vaccination regularly and systematically offered to the community. A physician may, with perfect propriety, offer to vaccinate any infant whose mother he had attended during accouchement, and may, with equal propriety, advise the vaccination of any of the children of the family not already protected. In fact, this attention on the part of the medical adviser is expected by the large majority of parents, though it has unfortunately fallen somewhat into disuse, from a natural disinclination on the part of the medical profession to proffer services, the motive for which might be liable to misconstruction. It would be, as I understand it, the duty of the health officer of the township, and the health physician or health physicians of cities in this State, to offer vaccination to each and every family in their respective districts, at least biennially, the town or city to pay, at rates fixed upon from time to time, for those unable to pay the customary fee. For the purpose of bringing the subject properly before the several health boards, the following preamble and resolutions are hereby offered:

WHEREAS, By vaccination, the people have complete immunity from small-pox;

Resolved, That the local boards of health in this State are advised and requested to authorize and instruct their respective health officers to offer vaccination biennially to all persons not protected by it.

HENRY F. LYSTER, M. D.

[The preamble and resolution were slightly amended and adopted by the State Board of Health, as follows:

WHEREAS, By means of vaccination and revaccination, the people may secure complete immunity from small-pox,

Resolved, That all local boards of health be advised and requested to direct their health physicians to offer, every year, vaccination with bovine vaccine virus to every child not previously vaccinated, and to all other persons not vaccinated within five years, without cost to the vaccinated, but at the general expense of the locality, as provided for townships in section 1736, Compiled Laws, 1871.

H. B. B., *Sec'y.*]

BATHS AND BATHING.

BY

HENRY F. LYSTER, A. M., M. D.,

OF DETROIT,

MEMBER OF THE

STATE BOARD OF HEALTH.

BATHS AND BATHING.

The use of the bath is a subject which possesses interest to us as individuals and as a community, for the reason that it is so general in its application. Whether considered in its sanitary influence upon the human being, its health-preserving properties upon those who are well, or its therapeutical qualities to those who are ill, or even as a luxury to those who seek a salutary enjoyment, it becomes of personal interest to us individually and to the State at large.

From the very earliest times we have frequent mention of the bath. Homer, transferred within the year from a mythical poet to an historical authority, refers to the polished marble of the bath, as well as to the enervating and effeminating properties of the warm bath upon those who indulged too frequently in its use.

We find throughout the whole biblical history in the old and the new testaments, frequent reference to the bath, indicating a custom in earlier times as general among eastern nations as it is at present. The modes of life, determined by the peculiar condition of the climate and the country, necessitated its use and have tended to maintain its importance as well as its popularity among the residents of the East.

The Greeks never constructed, so generally as the Romans, the public baths but used the rivers and the sea for bathing; yet there is every reason to believe from their letters that they fully appreciated the value of the bath and constructed a number of magnificent public baths.

The Romans used the bath twice each day, and in every village and city was found the public bath.

From beneath the ashes of Pompeii there was uncovered, more than fifty years ago, an enclosure of 10,000 square feet containing two distinct bathing establishments, and these do not compare with the larger ones of the capital. That of Caracalla, among others of great magnificence, was 1250 by 1500 feet; and in it thousands could bathe at the same time.

The religious teachings among the Asiatics inculcate bathing. The Mohammedan is required to say prayers five times daily, and to perform an ablution of the hands and feet before each prayer.

A public bath can be found in every village in Egypt and throughout India. Through the whole of the extensive dominions of the Czar of Russia, from the lord to the peasant, frequent bathing is the custom and not the exception. The steam bath is as universal among the Moscovites as is the hot-air bath among the Turks.

Among the nomadic tribes the bath is the nearest lake or river; but east or

west wherever permanent structures have been erected, we find the bath. In Mexico, we have the steam bath; in Japan, the swimming bath; in the north of Europe and throughout Russian Asia, the steam bath; in Turkey and the East, the hot-air bath; in Europe and America generally, the water bath of various temperatures.

The bath, though appreciated by many, and used very generally for purposes of cleanliness by a large majority of the better class of our citizens at stated intervals, is, we are confident, not resorted to so generally or so frequently as it should be by the masses of the people.

Those engaged in mechanical and other laborious employments are but little given to the use of the general bath, even for the apparently necessary purposes of cleanliness.

Dr. Rees, of England, wrote, some years ago, with reference to this decadence: "It must be owned that in spite of all the advantages derived from the habitual use of baths, with respect to both health and cleanliness, the moderns have until lately very much neglected to employ them; though from this censure we must except the Orientals and Turks, among whom the practice of the bath has been more easily preserved on account of its connection with religious worship. Among modern Europeans the practice of bathing has returned to the same condition it was when Homer described it in the earlier ages of Greece."

The limits of this paper will not allow of a discussion of the relative values, or even of a description, of all the varieties of the bath; and it will suffice here to assert that they may all be classified according to temperature, as cold, warm, and hot. Several varieties under these heads will be described.

It may be well before proceeding further to here arrange a table, taken from reliable sources, of the recognized temperatures of the bath:

Cold bath.....	32° to 60° F.
Cool ".....	60° to 75° F.
Temperate bath.....	75° to 85° F.
Tepid ".....	85° to 96° F.
Warm ".....	96° to 102° F.
Hot ".....	102° to 114° F.
Hot vapor (Russian).....	120° to 140° F.
Occasionally raised to.....	180° to 190° F.
Hot air (Turkish).....	130° to 175° F.
Occasionally raised to.....	250° to 280° F.

THE COLD BATH, 32° to 60° F.—The immediate effects of the cold bath is to elevate the temperature of the blood in the inner portions of the body 1.8° to 3.6° F. But this is only temporary and it soon becomes lowered beneath the usual temperature of 98.5° F., and does not recover its temperature until some time after removal from the bath. The temperature of the skin is lowered at once by the abstraction of the heat by the water of the bath. Six to nine degrees F. is endurable, but a lower depression of the temperature cannot be borne for any length of time. In extreme and fatal cases the temperature of the skin has been found to have fallen as many as 18° F.

The primary elevation of the temperature of the blood in the inner organs is caused by the contraction of the skin because of the cold impression upon it, which sends the blood to the vital organs in increased quantities, stimulates them to greater activity, leads to a more rapid oxidation, and lessens the ordinary radiation of heat from the surface. By prolonging the bath the temperature

of the blood in the internal organs falls more nearly to the temperature of the skin; and after the skin may, by reaction, have regained its temperature, these internal organs will be found below normal temperature for a few minutes, or it may be several hours before they regain their normal temperature, depending upon the constitutional condition of the individual.

The pulse is at first quickened, and subsequently becomes slower than before the bath; the respiration is similarly affected.

Authorities agree that with the elevation of the blood and the increased tissue-change, the carbonic acid is eliminated in extraordinary degree; one authority states that the carbonic acid is eliminated often 300 to 500 per cent. Dr. Braun, in speaking of this subject, says that the greatly increased change of non-azotized substances, as in all the various forms of the bath, shows a very different result from the changes which occur by the elevation of the temperature of the blood by acute fever; as in these latter cases the carbonic acid is only in exact proportion to the fever, and the azotized (nitrogenized) matter is consumed. In the cold, salt bath or the mineral bath, the same rule holds good; and by the imbibition of the water at the same time, changes may be increased in the azotized (nitrogenized) matter of the system.

This form of bath should be used for hygienic purposes only by persons in health, and when prompt reaction is obtained. Where there is heart disease or organic degenerations of any of the vital organs, the cold bath is not advisable as a general, or plunge bath. Profuse perspiration is induced by all forms of bath, the action of the skin is increased, the general circulation equalized, the muscular tone increased, and a sense of elasticity and strength is experienced in the mind and body. A brisk rubbing of the whole surface of the body with a coarse towel should follow all forms of the bath, but it is particularly required after the cold bath.

THE WARM BATH, 96° to 102° F.—A general preference for the warm bath is maintained for the reason that the sensation of warmth is in itself more agreeable than that of cold. There are other considerations which deservedly keep it in popular favor. It cleanses the skin more effectively, and removes more readily than the cold bath the sense of weariness when the muscles have been overtaxed by excessive exercise. It is a safer bath for those not in robust health. The cold bath, which contracts suddenly the superficial vessels and depresses the nervous system and lowers the general temperature and congests temporarily the vital organs, cannot be recommended to those in very delicate health, where there is not sufficient reactionary power; nor in cases of degeneration or organic change of the heart, lungs, liver, or kidneys. The general hot bath is only less liable than the cold bath to produce injury in a similar class of cases, overstimulating the nervous and circulatory systems and unduly elevating the temperature of the blood, if prolonged.

To the warm bath none of these objections obtains, and it illustrates the old maxim, *in medio tutissimus ibis*, "avoid extremes."

The healthy, vigorous person, or one with only moderate strength and tonicity, finds in the cold bath the proper strengthening and stimulating agent, increases his strength by its use, and is inclined to take more exercise.

The weary traveler or laborer will find in the warm bath the desired relief and restoration, more in fact than could be obtained by hours of rest and sleep.

Dr. Braun (Baths & Waters, Lond., 1875), illustrates the physiological effect as follows:

“There is no better remedy for painful weariness of the muscles after violent effort than a warm bath. The weariness of the muscles is due to immoderate accumulation of the products of their functions, for the further oxidation and secretion of which an amount of change of substance is required such as the over-wearied muscular fibre can no longer afford; in this case the increased physical heat appears as a momentary means of facilitating oxidation, and a warm bath has often in a moment the effect which, without it, could only have been obtained by hours and days of physical repose. Cold refreshes by stimulating the functions; heat, by physically facilitating them.”

The warm bath should be followed by sponging the surface with cool or cold water and by brisk rubbing with a coarse towel.

THE HOT BATH, 102° to 114° F.—This bath is a powerful stimulant to the entire system, and is used only in exceptional cases and is rarely required for hygienic effect. It is chiefly employed therapeutically, and belongs to conditions the discussion of which is beyond the province of this paper.

THE HOT AIR BATH, (Turkish) 130° to 200° F.—The Turkish bath, or the use of hot air for the production of profuse perspiration, followed immediately by shampooing and rubbing the whole body, and subsequently by laving the body with warm and cold water, and lastly by the cold douche or plunge bath, is at the same time one of the most valuable and the most luxurious of all the baths.

This bath could easily, and we hope will at not a very distant day, be supplied to every city and large village to meet the wants and necessities of the community. When the education of the people in sanitary matters is somewhat in advance of the present, the demand will be for its general and constant use.

The committee cannot well improve upon the description of the bath herewith submitted by the proprietors of the Turkish bath house, in Detroit:

“The Turkish Bath is the application of hot air to produce profuse perspiration, equalize the circulation, and assist nature to eliminate the waste or any poisonous element that ought to pass off by the skin. The perspiration is followed by a thorough manipulation of the whole body, which not only invigorates the muscular fibre, but helps to dislodge and set in motion foreign elements that have become localized; then follows a percussion of the surface with the open hand, concaved, the blows being given in rapid succession, drawing the blood into the minute capillaries and toning up the action of the skin. Next a thorough rubbing with brush and soap is followed by a forcible fine spray of water, beginning with a pleasant temperature of warm water, which is gradually cooled until the individual is sufficiently cooled to take the plunge (about 70° Fahr.), or the shower, or is in a proper condition to be wiped, after which he returns to the dressing and cooling room, where he lies or sits until the skin is dry, and he can dress without perspiring. The bath requires about one hour’s time, and with invalids is modified to meet the temperament and condition of the individual.

“We have two forms, the Improved Turkish Bath, consisting of a box about three feet square and four feet high, with an opening in the cover, through which the head protrudes, enabling the bather to breathe the natural air, while the body is surrounded with air from 120° to 160° Fahr., as the case may need.

“The Turkish Bath proper consists of a series of hot rooms, ordinarily ranging in temperature from 120° to 180° Fahr. We have two rooms about 10x14 feet each. The method of heating and ventilation is so arranged as to secure

a different temperature in different parts of the same room: the first room from 120° to 130° or 135° Fahr., and the second 20° to 25° higher, indicated by our thermometers as located in the first room, about 150° and in the second 170° Fahr.

“The time occupied in any part of the bath depends upon the condition of the individual; conditions are more arbitrary than time.

“In a cold, moist, inactive condition of the skin, we give a saline bath in connection with the Turkish, by shampooing with salt water prepared from Ditman’s Sea Salt, which invigorates the skin, securing a dry, warm circulation upon the surface. Our method of giving the sitz-bath: We use water about 70° Fahr., for the sitz, and as warm water for the feet as can be borne comfortably, accompanied with thorough rubbing of the back and abdomen, from fifteen to thirty minutes; then take the feet out of the warm water and immerse them in cold water for a few moments, then dry the patient thoroughly and let him rest in a recumbent position.

“In the use of water in connection with the baths we have a fine spray, delivered from a hose under the water-works pressure, with a temperature varying from hot to cold, so that local application can be made to any part of the body, with gradually modified temperature or sudden changes, as the case may require.

“We have also the Needle bath, a fine spray that strikes the whole body at the same time with force; and a Shower bath, both with a varying temperature under the control of the operator. Also an ascending douche for the perineal region.

“In the management of any bath or treatment for invalids, the success is not in the time or routine, but in a wise selection and manipulation of the means best adapted to the case in hand.”

For the purpose of simplifying the establishment required to give the complete Turkish bath, so that it may be introduced into any household as a portion of the domestic economy, we incorporate in this paper the following letter from a distinguished member of the legal profession, formerly a citizen of this State and now a resident of Ontario, originally published in the *Chatham Planet* newspaper. This account is not from a theoretical view, but after a practical experience of the home-made Turkish bath. The therapeutical value of this bath is well known, and it is hoped that this description may be of value to the medical profession as well as to the general public:

THE HOME-MADE TURKISH BATH.

As is well known, the *sudatorium*, or hot bath, has in all ages been used alike in Asia, Europe, and America. The Romans rejoiced in its use. The people of the East and especially the Turks use it no less as a luxury of the toilet than as a medical agent. Their daily bath is the *hot* one, and all who know of the habits of our native Indians know that their hot bath, while very primitive, is most efficacious as a cure for different diseases. The Turk rebukes western civilization by saying that the cold bath of the European is only rubbing the dirt in. But in a good *sweat*—it is a mistake to talk of perspiration—there is not only essential cleanliness, but a most active hygienic agent. A vigorous sweating carries off impurities of the system, and if no other good were brought about than the great activity in the circulation of the blood and its attendant advantages, much good would be done. In a man of ordinary size there are twenty-eight miles of sewerage through the pores of the body, and on a square inch of the palm of the hand there are 3,500 pores. Now consider the effect of having all these pipes either stopped or working imperfectly. So peculiar is the human system that it will not sweat, except in a very partial way, even under a very high temperature; and indeed with a heat of 150 degrees only one-third or one-half the body will sweat at first, and it may take a half-dozen of baths to make the body

work fully. While cleanliness and comfort are the immediate results of this bath, it is surprising how effectual it is in the relief of certain forms of disease.

To enjoy the benefits of this bath it is not necessary that there should be hot chambers, couches, shampooing, &c., as found in the public establishments of this kind. The essence of the bath lies in a full and complete sweating under a temperature of 130 or 150 degrees, and then having *cold* water applied to you. The ease with which this bath may be provided should insure for it very general adoption. Here it is: Take a spirit lamp with four wicks, about the size of an oyster can, using alcohol instead of oil, the cost of which would be about six cents each bath; place this beneath an ordinary wooden chair, on the bottom of which tack a piece of zinc, put on a crinoline which ties around the neck and covers the chair, and sit there for say half an hour. The crinoline is made of three hoops covered with a calico or oil skin. The bottom hoop should be about twelve feet in circumference, the second about seven, and the third about four feet. The Germans in using this bath always use a foot bath of hot water at the same time. The cold water is used, as you take the usual cold bath, with sponge. It is a mistake to suppose that the cold water causes any shock—it is only most agreeable. And it is another mistake to suppose that it leads to colds in the head, chills, or any unpleasant effect. On the contrary, the almost immediate effect of this bath is to make the body quite indifferent to any change of temperature. After five or six baths one could roll in the snow *sans culotte* and not take cold.

HOT VAPOR BATH (Russian) 120° to 158° F.—This bath, which is given in graduated temperatures, all higher than the blood, produces a stimulation of the general circulation and profuse sweating, or diaphoresis. The vapor coming in contact with the cooler skin is condensed and protects it from the extreme heat. This also takes place on the bronchial mucous membrane and enables the vapor to be breathed.

This bath ranks second only to the Turkish bath as a luxury and cleanser to the skin. It is followed by the same laving and ablutions as is the latter, and may be recommended to the general public.

MINERAL BATHS.—For ages, certain mineral waters have had a world-wide reputation as baths, and it has usually been an accepted faith that the system took up through absorption these medicated waters, and that on this account the frequenters of the baths improved, in many instances, wonderfully. Occular proof is not wanting, that wan and worn out pilgrims to celebrated baths and watering places at the sea shore come back, each year, restored to perfect health and strength.

This is proof positive to the multitude that there is great and specific virtue in mineral baths. It has, however, been impossible to determine how much of the cure has been due to change of air and scene and diet, and freedom from care and labor, as well as to the internal use of the mineral waters. Great doubt is now expressed as to whether there is really any virtue in mineral baths over those of simple water, if we except the salt and the sulphur baths.

Many observers in different countries, after series of experiments, are of the opinion that but little, if any, effect is produced upon the bather by the mineral bath, if we except the two baths just mentioned. Dr. Braun (*op. cit.*) says: "It is enough that for the present the absorption of gases is an established fact, and that, as will be subsequently shown in discussing the waters that contain common salt, the effect of this cannot be mechanically explained. In general, however, a very cogent reason speaks against the absorption of considerable quantities of salts; if this did occur, what deleterious effects upon the blood must inevitably appear!" * * * * "We have to put out of account, in the effect of baths, the absorption of saline elements, and we have only to take into consideration the absorption of gases, such as sulphuretted

hydrogen and carbonic acid. In the estimate of *baths*, therefore, we may set aside the amount they contain of iron, lime, the sulphates of soda and of magnesia, soda, iodine, bromine, and arsenic; and as special baths we have only to consider those containing carbonic acid, the sulphur baths, and besides these, the sool-baths the clinical effect of which is established and to be explained in a mechanically chemical manner; the moor-baths, in which special chemical agents are added to the general thermic effect, and sea-baths. The amount contained of other salts is only of importance in courses of drinking, and even the gases, sulphuretted hydrogen and carbonic acid, taken internally, produce a thoroughly different effect from that caused by their outward application to the skin."

The sool, or salt baths produce a greater stimulating effect than simple water, but do not materially differ from the sea bathing in this respect, except that they may both be given at a lower temperature than the simple bath for the same effect.

The sulphur bath, which is supposed to depend upon the sulphuretted hydrogen gas for its effects, is still *sub judice*, so far as any positive indication exists that it excels the indifferent thermal or ordinary baths. There certainly can be no great amount of this gas absorbed, or it would prove immediately disastrous. The fact that there exists no magnetic quality in the mineral waters has been determined by all accurate observers on this point. Among others we may mention the President of this board (*vide* Trans. Mich. State Med. Soc., 1871), and Prof. Hilgarde of Washington, and Dr. Walton of Cincinnati, (Mineral Springs U. S. and Canada, 1873).

It may be mentioned in this connection, that, though the use of the mineral baths may not be, with the exception of the sool-baths and sulphur-baths, in any respect inferior to the ordinary baths, this is not to be understood as underrating the internal use of mineral waters. While on the one hand the baths are used, at the same time the mineral waters are drank, and in many cases with very great advantage to the general health. The mineral waters or springs should be selected rather on account of the anticipated effects from the internal use of the waters than on account of any effect from supposed absorption from bathing; and especially should this be recognized when any therapeutical effect is to be sought.

SEA BATHS.—The sea baths do not differ materially in their effects from the sool-baths, except that the salt air and the bracing atmosphere of the coast ensure more positive effects. It is impossible to separate the effects of the changes due to the coast and to the influence of the surroundings, from those produced by the baths. It is well known that the change, without the sea bathing, is in itself a great one and productive of the very best results. As the baths are usually taken by those going to the watering places on the coast, we can only give the result of the combination. There is usually a greatly increased tissue-change and a corresponding increase of appetite and weight, unless the visitors are the subjects of chronic disease advanced sufficiently to prevent a corresponding repair and assimilation of food. The value of these baths, particularly to those going from inland and malarious countries, is inestimable and is abundantly manifested to those who observe persons going and returning each season.

With the intention of arriving at a more definite knowledge of the extent to which the bath is in use among the people of this State, as well as to determine the value placed upon it by the medical profession, the committee addressed to a number of the correspondents the following circular:

DETROIT, *August, 1877.*

DEAR SIR:—In the preparation of a paper upon Baths and Bathing, for the State Board of Health, I desire to avail myself of statements of facts and opinions by the regular correspondents of the Board, and will feel under obligations to those correspondents who will have the kindness to send me replies to the following questions. Please use the stamped envelope enclosed herewith, and leave all additional postage to be paid by me:

1. In your neighborhood, what is the custom of the people in the use of the bath?
2. What kind of baths are used?
3. How frequently are they used for cleanliness?
4. How generally are they employed for hygienic purposes?
5. How many public bathing establishments are there in your vicinity?
6. Please describe any such establishments, and state what form of bath is given.
7. What are your views concerning the use of the bath as a sanitary measure?
8. What form of bath do you recommend as preferable for its hygienic effect?
9. Do you suggest any variation in the form of the bath to meet the conditions at different seasons of the year?

To this, forty-six replies have been received. These will be introduced alphabetically according to the town, and will be found to represent geographically the whole State. The number of the answer will correspond to that of the question in the circular.

Adrian.—REPORTED BY ROBERT STEPHENSON, M. D.

1. A bath once a week by better class who have bath rooms. The majority of people sponge-bath two or three times a year. There is a certain class who probably are never wet from head to foot except, may be, by a rain storm.
2. Plunge-bath; a very few use the shower-bath.
4. Not generally.
5. One, at present time.
6. Mineral spring hotel has about twenty bath-tubs.
7. I look upon the bath as a necessary adjunct for the maintenance of the body in a state of health.
8. Plunge-bath with temperature a little below that of the body.
9. Temperature of bath should vary with seasons; colder in winter, warmer in summer.

Albion.—REPORTED BY JOHN P. STODDARD, M. D.

1. Chiefly sponge-bath; a few, perhaps two per cent have bath-tubs in their houses.
3. Once a week.
4. About the same.
5. None.
7. I think it to be a useful and necessary measure,
8. Usually the plunge or sponge-bath.
9. Summer, cool plunge-bath; winter, lukewarm sponge-bath.

Ann Arbor.—REPORTED BY GEO. E. FROTHINGHAM, M. D., AND WM. F. BREAKEY, M. D.

1. I can say but little from observation, on this subject.
2. Warm full baths, but more frequently sponge-baths.
3. Perhaps once or twice a week.
4. Very seldom.
5. One.
6. This establishment has a dozen bath-rooms, and facilities for giving the usual variety of baths.
7. I believe it can be made very effective.
8. For ordinary use the full, tepid or warm bath.
9. Atmosphere at uniform and moderately high temperature usually.

Battle Creek.—REPORTED BY J. H. KELLOGG, M. D.

1. No prevalent custom.
2. Full bath and sponge-bath.
3. I am satisfied that there is great neglect. I have met with several persons who seemed very much surprised when I recommended a warm bath, although such application was eminently proper for cleanliness. In one case a patient who had been a laboring man the most of his life, declared that not a drop of water had touched his back for forty years. Another man, upwards of fifty years of age, stated that he had never taken a bath in his life. It is a general custom with quite a portion of this community to take a bath regularly at least once a week; many bathe more frequently during the warm weather.
4. Although the use of the bath in this locality is far less frequent and thorough than should be, probably there are very few communities in which correct habits in this respect are so nearly approximated as here, considerable pains having been taken to instruct the people of the vicinity in this and other hygienic measures.
5. One. All usual kinds of baths administered under direction of physician. The full bath at 85° to 92° F., most frequently employed.
7. One of the most important sanitary measures, and its neglect predisposes to disease malady.
8. Full bath at 85° F. to 92° F. For daily bath I prefer the sponge-bath.
9. Warm bath for winter; summer, tepid, sponge, or shower.

Brooklyn.—REPORTED BY E. N. PALMER, M. D.

1. Bathing pretty generally neglected.
3. Very seldom.
4. Never unless ordered by physician.
7. Great benefit as a sanitary measure.
8. Any form.
9. The most convenient to give.

Charlotte.—REPORTED BY G. B. ALLEN, M. D.

1. Frequent.
2. Sponge-bath. A few homes have bath-tubs.
3. About once a week, average.
4. Not very generally.
5. One.
6. In basement connected with barber shop. Dark, and poorly ventilated.
7. When properly used, valuable.
8. Sponge and plunge, preferable.

Coldwater.—REPORTED BY J. H. BEECH, M. D., AND LOUIS H. WURTZ, M. D.

1. Customary to use some kind of bath; about same as in other parts of State.
2. A majority of best houses have bath-room; but few in the middle classes have more than a tub. The working men and boys bathe in the river in the summer. Sponge-bath is used.
3. No general custom; individual taste regulates the use of the bath: once a week on average; some every 2 or 3 days; a few daily.
4. Not generally used for hygiene; those who use the bath daily do so as a hygienic measure.
5. None at present; several have been started, but the people have a prejudice against them on account of small size and limited accommodations.
7. That unmedicated baths are of great sanitary value. Not more than one in twenty-four hours. Shocks should be avoided and bath not prolonged; weary persons cannot bathe every day; in others it prolongs life and prevents disease.
8. That which is most agreeable at the time. The plunge or douche is objectionable.
9. Sponge-bath best for continued use, and temperature of room not too low.

Carson City.—REPORTED BY WILLIAM RICHARDSON, M. D.

1. Our neighborhood deplorably deficient in the use of the bath; only a few families use it for cleanliness. The old lady's habit is nearly the universal one, who, in speaking about her daughter-in-law, said, "La, me! what nonsense; Maria takes a bath every week or two. I can't remember when I took one."
6. The mill company built a small house over a deep hole in the race, for public use; and a few persons avail themselves of that opportunity.

De Witt.—REPORTED BY GEO. W. TOPPING, M. D.

1. About two-fifths of the people bathe once a week during the entire year, and during the hot weather often twice or more per week. About two-fifths bathe irregularly during the warm weather, and once in 2 to 4 weeks in cold; one-fifth, 3 or 4 times during warm weather, and not at all during the cold.

2. Mostly sponge-baths. In warm weather many men and boys bathe in river and lakes.

7. Important sanitary measure, and too much neglected. A very few persons use it too much.

8. Prefer the tepid bath with a little alkali added.

9. Warm weather, prefer cool bath; and at other seasons, tepid.

Dearborn.—REPORTED BY E. S. SNOW, M. D.

1. The custom is various; some, every day; and others, very seldom.

2. Sponge-bath usually adopted, and swimming bath in summer.

3. Once a week.

4. About one in twenty.

5. One.

6. Bath-tubs filled with mineral water from a well 350 feet in depth. The saline ingredients are chiefly sulphate of soda and chloride of sodium.

7. Highly approve of the bath.

8. Swimming-bath.

9. Cool sponge-bath, particularly in winter.

Detroit.—REPORTED BY W. H. ROUSE, M. D., AND H. F. LYSTER, M. D.

1. Custom varies with the different individuals and classes.

2. Sponge-bath most common; warm or cold medicated baths but little used. The sulphur springs are visited by some.

3. Some, daily; others, once a week.

4. But few use them for hygienic purposes.

5 & 6. There are several establishments where a variety of baths may be had under private control. There is a large number of places connected with barber shops and hotels where hot and cold general baths may be obtained. There is a large establishment where medicated baths are furnished, and there the complete Turkish bath is given. In the upper extremity of the city two large swimming-baths have been built, one for males and the other for females, to be used during the summer. Below the city are two bath-houses, one for each sex, supplied, from an artesian spring, with sulphur water. The amount of sulphuretted hydrogen gas is unusually large. Hot and cold baths can be given throughout the year. No public bath-houses have as yet been built by the city on the river front, though greatly needed.

7. When properly given, they are of great service.

8. The plunge-bath one of the best; sponge-bath most available; swimming-bath, being attended by exercise, is valuable.

East Saginaw.—REPORTED BY NELSON H. CLAPLIN, M. D.

1. Many do not bathe.

2. Warm or cold, general bath.

3. About once a week.

4. Very seldom.

5. Two.

6. Bath connected with hotel barber shops. One has five tubs; the other, three; used by men only. Average number of baths given in both, 160 per month.

7. Frequent baths necessary for cleanliness and hygienic purposes.

8. Cold enough for reaction to be required.

9. The room should be warm and no draft allowed.

Elsie.—REPORTED BY E. V. CHASE, M. D.

1. The custom is to abstain as long as possible, and then use the river or pond, in warm weather.

2. Sitz-bath, with general ablution.

3. Not more than half often enough.

4. When ordered by a physician.

5. None.

7. Increased use advisable.
8. Prefer a saline bath.
9. Change temperature according to weather.

Flint.—REPORTED BY H. C. FAIRBANKS, M. D., AND LEROY PARKER, ESQ.

1. Each family bathes, or not, according to their opinion of the benefits.
2. Tepid and cold soft water.
3. Varies with the family opinion.
4. Resorted to pretty generally by some; but not so, taking the whole population.
5. One.
6. Soft and mineral baths of any temperature, or a vapor bath; used by each sex.
7. I believe them to be essential to good health.
8. Tepid, general bath.
9. Vary, somewhat, with atmospheric temperature.

Fyfe Lake.—REPORTED BY H. T. CALKINS, M. D.

1. I know of but two or three houses with bath-tubs. During summer, a portion of the male population bathe in the lakes.
2. The majority do not bathe often enough for personal cleanliness, very few taking a full bath once a week; some, perhaps, not once a year.
7. I do not regard the bath very favorably as a hygienic measure. In my opinion it renders the skin too active and at a low temperature. The bath in many cases is hurtful.
9. Not too hot or too cold, or too often.

Greenville.—REPORTED BY O. E. HERRICK, M. D.

1. Perhaps one-half bathe once a week.
2. Sponge-bath, soft water.
3. Perhaps once a week.
4. I fear they are used very little, though advised by all of our physicians.
7. Very essential; should be used as often as three times a week in warm weather, and once a week in cold.
9. Temperature should be near that of the body if bather is well. Bad effects frequently produced by too cold bathing.

Hubbardston.—REPORTED BY H. W. BROWNE, M. D.

1. In warm weather, once a week or so; but not generally used.
(A prejudice against general baths prevails, on the ground that a person takes cold. One old lady told me that not a drop of water had touched her skin for twenty years, as her sister had been bathed to death while under medical advice. If public baths could be maintained in each township, many diseases could be prevented.)
2. Warm and cold general baths.
3. Some, once a week; some, daily; others, two or three times a week.
5. One; a magnetic well, so called.
6. Arranged for hot and cold water and shower-baths.
7. Once a week, at least, would be preventive of disease.
8. Turkish bath; next in order, the hot bath.
9. Cool in warm weather, and warm in cold.

Howell.—REPORTED BY C. V. BEEBE, M. D.

1. Doubtless more or less bathing is performed.
2. Sponge-bath, usually.
3. The bathing is used entirely for this purpose.
4. Not regarded by the people at large.
7. Highly useful as a sanitary measure.
8. Very near temperature of body.
9. More friction after bath in cold weather.

Hillsdale.—REPORTED BY J. W. FALLEY, M. D.

1. Many people have bath-rooms.
2. General baths, and sponge-baths.
3. Many, every other day.
4. One female in twenty; one male in fifty.
5. One.

6. Hot and cold.
7. Valuable, but may be used too frequently.
9. Temperature should be carefully adapted to individuals.

Hudson.—REPORTED BY A. R. SMART, M. D.

1. Majority use some form once a week; more frequently in summer.
2. Sponge-baths, shower, plunge, and swimming in river.
3. During warm weather, and with children, daily; once or twice per week, the average.
4. Not often for hygiene, purely.
5. A bath-tub at depot, supplied by artesian well.
6. Sponge, hot and cold, and shower baths.
7. Great value, in majority of cases.
8. Sponge-bath in general.
9. Temperature according to season.

Homerville.—REPORTED BY O. S. PHELPS, M. D.

1. Only used for cleanliness, unless prescribed.
2. Sponge-bath.
3. Probably not oftener than once a week.
4. Not very generally.
7. Very useful.
9. As near temperature of weather as can be borne safely.

Hastings.—REPORTED BY A. P. DRAKE, M. D.

1. No uniformity; not generally used.
2. Sponge.
3. Once a week.

Kalamazoo.—REPORTED BY H. O. HITCHCOCK, M. D., AND W. B. SOUTHWARD, M. D.

1. Comparatively few use baths besides the sponge-bath.
2. Warm bath, all ordinary kinds sometimes used.
3. Perhaps once or twice a week.
4. Seldom.
5. Four or five.
6. Warm or cold, generally both; two medicated and electrical.
7. Regular and not too frequent use is a most important sanitary measure.
8. Depends upon what effect is desired.

Lansing.—REPORTED BY IRA H. BARTHOLOMEW, M. D.

6. A plunge-bath, 4 to 6 feet deep and 40 to 60 feet square, is used to some extent by males. There is a bath-house with 12 baths for either warm or cold water.
7. I do not think that frequent bathing is desirable, as a rule. Daily bathing is not only unnecessary but in many cases highly injurious. Many who practice it are in feeble health and need tonics. The warm or tepid bath is preferable as a rule in all seasons.

Lapeer.—REPORTED BY ALFRED NASH, M. D.

1. Much neglected.
2. Sponge.
3. Weekly.
4. Not generally.
7. Should be used generally.
8. General bath.

Mendon.—REPORTED BY H. C. CLAPP, M. D.

1. No systematic habit. In summer, young people bathe in the river and lakes and older people improvise an occasional bath at home.
2. Hot, tepid, and cold.
3. Hot very often.
4. Not except when advised by physician.
7. More frequent use advisable, and too much ignored by physicians, and capable of much mischief in hands of empirics.
8. Sponge-bath.
9. Temperature to suit individual taste.

Marquette.—REPORTED BY GEO. J. NORTHIROP, M. D.

1. In warm season some use made of lake and river.
2. About 30 homes have bath-rooms.
5. One; reasonably well patronized.

Northville.—REPORTED BY JOHN M. SWIFT, M. D.

2. Sponge and swimming baths.
3. One to six times a week: average, twice.
4. Not frequently.
7. May be used too much; usually once in three or four days.
8. Sponge, soft water, alkaline, comfortable tubs.
9. Not to cool in summer or too warm in winter.

North Lansing.—REPORTED BY O. MARSHALL, M. D.

1. Once or twice weekly. Infants every other day at least.
2. Very few bath-rooms; sponge-bath more common.

Olsego.—REPORTED BY MILTON CHASE, M. D.

1. Not frequent or general custom.
2. A few have tubs. Rivers and lakes used in summer.
3. Will not average one per month.
4. Not much employed except at the public bath.
5. One.
6. Bath-tubs; water at temperature to suit; closed in cold weather.
8. Tepid bath once a week.

Ovid.—REPORTED BY O. B. CAMPBELL, M. D.

1. Better class attend to bathing, but poorer class neglect it almost entirely.
2. Warm bath.
3. Once a week.
7. Great importance to health.

Ottawa.—REPORTED BY ———.

1. In warm weather young males bathe often, and at the summer resorts the bath is used frequently.
2. Sponge-bath.
3. Once a week, average.
5. One.
6. Tubs for general bathing, hot and cold water.
7. Once a week is sufficient and is valuable; too indiscriminate use is dangerous.
8. Temperature to suit individuals; hot vapor from under blanket, patient on chair, and a heated stone placed in pail of water.
9. Usually about 80° F.

Otisville.—REPORTED BY A. W. NICHOLSON, M. D.

1. No general custom.
2. Warm or cold.
7. I consider daily baths tend to prevent spreading of infectious diseases. Negligence must add to list of causes of sporadic and endemic disease.
8. Tepid.
9. Moderate temperature, nearly that of the air of the room.

Port Sanilac.—REPORTED BY J. M. LOOP, M. D.

1. Very little used by people generally.
2. Tepid.
3. Twice a week.
7. I believe it to be a healthful practice.
8. Tepid salt water or alkaline bath, with brisk rubbing.
9. The temperature to correspond relatively to the season; cooler in winter than in summer.

Rockford.—REPORTED BY D. W. C. BURCH, M. D.

1. People bathe pretty generally, particularly in warm weather.
2. Warm and cold general baths.

- *3. Large majority not oftener than once a week.
- 4. Occasionally only.
- 7. Sponge-bath, at least once a week. Twice a week may not be objectionable.
- 8. Sponge-bath, tepid water.

St. Joseph.—REPORTED BY R. F. STRATTON, M. D.

- 1. As a matter of cleanliness.
- 2. Tepid.
- 3. Children daily to 2 years, then twice per week; adults once a week.
- 4. Only in a few cases.
- 7. I believe it develops the strength; well bathed children are better grown and are less likely to contract colds and contagious diseases.
- 8. Sponge-baths for invalids; and general baths at temperature to suit, for well persons.

Three Rivers.—REPORTED BY C. W. BACKUS, M. D., AND L. S. STEVENS, M. D.

- 1. Custom same as through the villages in the State.
- 2. Sponge-baths.
- 3. Once a week.
- 4. Two or three times a week, or as ordered by physicians.
- 5. One.
- 6. Six or eight bath-tubs; mineral water containing iron. Warm, hot and cold baths given. Hot baths 90° to 106° F., well patronized.
- 7. Necessary for health.
- 8. Warm baths.
- 9. Temperature to meet season.

Thorneville.—REPORTED BY JOHN S. CAULKINS, M. D.

- 1. Quite limited, especially in cold weather. Lakes and rivers used by men and boys, in summer.
- 2. Sponge-bath.
- 7. Bathing is conducive to mental and physical health, and enables one to accomplish greater intellectual and physical work.
- 8. Tepid general bath.

State Prison, Jackson.—REPORTED BY GEN. WM. HUMPHREY, WARDEN.

The Warden reports under date of September 28, 1877:

"Our bathing facilities are so limited and inconvenient that we can say but little of the matter at present. Bathing is, however, considered of so much importance by us that we are preparing an admirable bathing room for use of convicts, which we shall get in operation in October."

Wayne County Poor-house.

"Bathing has not been practiced here with any system," the Superintendent writes, "We have had no conveniences for it until now. The superintendents of the poor have just arranged a room, tub, and all the necessary apparatus, but have not as yet made any rule, but will probably require all inmates to bathe at stated times."

Detroit House of Correction.

The Superintendent reports as follows: "We use the bath for cleansing the body. All prisoners are required to bathe when received into the institution, and regularly once each week thereafter, while they remain."

State Public School, Colliwater.

"I have great faith in the hygienic value of bathing and cleanliness generally," writes the Superintendent. "Our children take a full bath each week, using abundance of water and good soap, and our health at most seasons of the year is almost perfect. At one time last winter and spring, for five months we did not have a single case of serious sickness. Morally, I do not think that a pure mind can for a long time dwell in a dirty body, and *vice versa*. I think cleanliness is reformatory in its tendencies."

In the *Lapeer County Poor House*, the inmates receive a bath upon admission, and once each week, as I am informed by our correspondent in Lapeer city; a custom which, if followed by all the county asylums for the poor, would be followed by incalculable good to a class we are entirely unable to reach in any other way.

MICHIGAN ASYLUM FOR THE INSANE, }
KALAMAZOO, OCT. 8, 1877. }

DR. HENRY F. LYSTER, *Member State Board of Health:*

DEAR SIR:—In reply to your request, I would say briefly that the tepid bath is of general use in this Institution as a hygienic, rather than a therapeutic agency, except in a few rare instances which will be hereafter specified. It is employed regularly with patients of all ages and in varying physical conditions, and together with proper ventilation and warming, good sewerage, drainage, etc., is a valuable addition to remedial measures, as well as a means of preventing disease. Those patients who have had access to bathing facilities at home are comparatively few, and among these, of course, we would not look for special results from regular systematic bathing. The majority, however, have been unable, through lack of facilities, to pay much attention to this or other hygienic measures. Some have never bathed regularly, and scarcely at all during the winter season. Even among those who have attempted regular bathing, there has often been a lack of proper conveniences, so that the bath has of necessity been a hurried one, and no effort has been made to secure any modification of the temperature of the water beyond what would naturally occur from atmospheric influences.

Among the insane, more than almost any other class of hospital patients, there is almost invariably found upon admission, a harsh, dry skin, a sallow complexion, a peculiar tallowy odor from the surface, and a general appearance of cutaneous innutrition. Associated with this is constipation, scanty urinary secretion, little insensible perspiration, inequality of the circulation, and headache, or more frequently a sense of weight and constriction at the vertex. The whole system sympathizes with the mental derangement, and scarcely a single function of the body is efficiently and properly performed. This condition is present, to some extent, in all forms of mental disease, but is more uniformly found in cases of melancholia, subacute mania, secondary dementia, and the forms of paralysis; and in these the greatest benefit is found to result from systematic bathing.

At the Asylum, all baths are given as far as practicable at the normal temperature of the body, with such deviations as the individual preference of the patient may dictate, some patients (the majority), desiring the bath very hot, and others asking merely "to have the chill taken off the water." The period during which the body is immersed in the water is also left to the preference of the individual, care being taken that he is not exhausted by it. The whole surface of the body is covered with soap and scrubbed with a moderately stiff brush in the hands of an attendant, and absolute cleanliness is insisted upon. Under the systematic use of a bath of this character, very gratifying changes occur. The harsh, dry skin disappears, the capillary circulation becomes active, the complexion clears up, and the body is better nourished. The train of disturbances in the physical functions disappears, and the whole system is in a condition to appropriate and to assimilate food and medicine. The moral tone of the patient is also elevated, and he becomes self-respecting and observant of the proprieties of life.

Among the indirect benefits resulting from bathing, may be mentioned a comparative freedom from bronchitis and pneumonia. This is due to the fact that the skin is kept constantly acting and the system is not unduly sensitive to cold. It is also probable that digestive derangements are less severe from a similar cause. Although the matter, from the nature of the case, is not capable of demonstration, there is reason to suppose that the comparative immunity from tubercular disease among our patients is remotely connected with the fact that the process of elimination by the skin is actively carried on.

A few words upon our use of the bath as a therapeutic measure may not be out of place. In certain forms of acute maniacal excitement, characterized by a hot, dry skin, a flushed face and cold extremities, the prolonged administration of a hot bath frequently produces several hours of refreshing sleep. It simply acts by stimulating the action of the capillaries and equalizing the circulation. The same result is sometimes obtained by applying cold to the head while the body is immersed in a warm bath, but this is only admissible when a strong tendency to cerebral congestion exists. In feeble, exhausted persons much benefit is often obtained from sponging the body with tepid water and afterwards using spirits with friction until the cutaneous surface is thoroughly stimulated.

The Turkish bath, which has been much praised in asylums in England and upon the Continent, has never been employed here; partly because the patients who seek the aid of the Asylum are uniformly feeble and broken down and seem unfitted for its use, and partly because the experience of a similar asylum in an adjoining State

showed that it was capable of doing great harm, and of doubtful utility even to the strong and comparatively healthy.

I regret that I have so little leisure for writing, as there are several points in connection with this subject upon which much more might be written. I have merely attempted to give you some account of our method of using baths. You will perceive that it has not even the merit of novelty; still, old as it is, we would not willingly discard it.

Very truly yours,

GEO. C. PALMER,
Ass't Med'l Supt.

The following letter from the present Superintendent of the Wisconsin State Hospital for the Insane, the institution referred to in the foregoing communication, does not condemn the Turkish bath as a remedial agent, but intimates that it has fallen into disuse rather from the fact that it was not applicable without considerable addition to the current expense.

WISCONSIN STATE HOSPITAL FOR THE INSANE, }
MENDOTA, OCTOBER 18, 1877. }

HENRY F. LYSTER, M. D., *Detroit*:

DEAR DOCTOR:—A Turkish bath was fitted up here some years ago, and was used during one winter. No record was kept of the baths or results, that would be of any use to any one wanting reliable information. It was before my time here. I have, however, been told that some good was supposed to result from it. It was found, however, that to serve so large a number of patients as seemed to require it, would involve a number of extra employés to work the bath, making it in the end rather an expensive curative means, considering the result apparently secured. At all events, it lapsed into total disuse after a few months' trial, and has been dismantled and rendered difficult to refit. I have doubt of the successful use of Turkish baths, except in private hospitals where they have few patients and much money. I am not informed as to the use made of them in other hospitals. I know of none using them.

Yours,

D. F. BOUGHTON.

From the very interesting account, by the Ass't Superintendent of the Michigan Asylum, of the physical condition of the insane, and from our own extensive practical knowledge of the use of the Turkish bath among well and sick persons, we would be glad to see its more general introduction into the hospitals for the insane, as well as into all other hospitals. This view may be somewhat at variance with the present management of nearly all of our eleemosynary institutions; but it is, we are confident, founded upon a just appreciation of the value of the hot-air bath. We will not pursue this matter further, lest we enter upon a discussion of its extensive therapy, which would be out of place in this report.

We annex a list of the more celebrated mineral springs of Michigan, the waters of which are used internally by those frequenting them. Some of them are very valuable as baths, notably the salt and sulphur springs, while all are serviceable in certain forms of disease:

Adrian.—Carb. lime, magnesia and iron, and sulphate of soda. (*Mildly chalybeate.*)

Ann Arbor.—1. Bi. carb. iron, lime, magnesia, free carbonic acid. (*Mildly chalybeate.*)

2. Sulph. magnesia, lime, soda, potassa. 3. Chloride of sodium, magnesium, and sulphate of soda and potassa.

Grand Rapids.—Chloride of magnesium, potassium and sodium, and sulphate of lime. (*Calcic, resembles Bath waters, Eng.*)

Eaton Rapids.—Carbonate of lime and sulphate of lime, and free carbonic acid.

Leslie.—Carb. lime and iron. (*Mildly chalybeate.*)

Hubbardston.—Carb. lime.

Fruitport.—Chlor. sodium and calcium, and sulph. soda. (*Resembles Kreuznach, Prussia.*)

Lansing.—Chloride of sodium; bicarbonates of lime, soda, magnesia, and iron; sulphates of potash and soda. (*Alkaline*.)

Mount Clemens.—Chloride sodium, mag., and calcium; sulph. soda and magnesia, free sulphuretted hydrogen. (*Salt sulphur bath*.)

Remarkable for strength of saline water, requires dilution in bath and for internal use. Sulphuretted hydrogen is in large quantity.

Ocosso.—Carb. magnesia, sul. iron and lime. (*Strongly Chalybeate*.)

St. Louis.—Carb. soda, mag., calc. and sulph. calc., and free carbonic acid. (*Calcic*.)

Detroit Mineral Springs (Springwells).—Carb. calc., sulph. calc., sulph. mag., chloride sodium, sulphuretted hydrogen, carbonic acid. (*Sulphur bath*.)

Remarkable for large amount of sulphuretted hydrogen gas, 6,992 grains, = 19.02 cubic inches, to gallon.

A salt bath is also given at this spring, combined with the sulphur water.

The workings of this board are strictly within the limits of preventive medicine, and it would be out of place in this connection to enter upon the very interesting province of the therapeutical value of baths or their adaptability to the cure of disease. Suffice it to say here that they are made use of at present among the people and by the medical profession more generally than they are as a hygienic measure by persons in health; and we are happy to state that they are more and more appreciated each year in every respect. The general impression derived from a review of this subject and from the replies received from the correspondents of this committee is that the regular and systematic use of the bath has not come into general appreciation, particularly among the mechanics and farming people; that while the better educated and professional classes use the bath in moderation and for the purposes of cleanliness, but very few of these use it as a hygienic measure, to restore and invigorate the system. The masses of the people are, to say the least, very little accustomed to the general ablution of the body,—in other words, are not clean.

The hard working man, by the perspiration he induces, opens the pores of the skin and gives the body a general bath, and, provided he changed his linen frequently and rubbed the skin with a towel, would need the bath less than any one else upon physiological grounds, because he keeps the skin in an active and healthful condition by exercise; yet there is no doubt but that he would be invigorated by a proper bath, would feel less tired after his work, would need less sleep, and could more easily accomplish his task.

“As the twig is bent the tree is inclined.” This bending process in the direction of the frequent and general use of the bath must come in Michigan from the proper education of the children in hygiene at the schools, inasmuch as we believe that they do not have the force of the example of their parents in these matters, at all as generally as the subject deserves.

The beautiful form and figure of man, fashioned in the image of his Maker, should not be permitted to be defiled by uncleanness, but it should be kept pure and polished by constant ablutions. The old Roman axiom “*sana mens in corpore sano*,” “a sound mind in a sound body,” is a true one; to endeavor to preserve it is one of our chief duties; and to do this there is nothing more necessary than the proper and constant use of the bath in some form.

That there is undoubtedly a moral aspect to this subject, no one will doubt who has thought deeply upon the great questions of how to elevate the lower classes up to the plane of appreciating the advantages opened up to them by the present general amelioration of the condition of those compelled to work with their hands for their daily bread. The State sets the example, in her public institutions, in her prisons, asylums, and schools, and in some of her county poorhouses. The bath comes immediately after the certificate of admis-

sion, and is repeated, according to the rules of the institution, with greater or less frequency.

It is not so much in the nature of our government to provide for the people, as it is to enlighten them by general education so as to enable them to provide for themselves. The demand must exist and the supply will be forthcoming. We can hardly expect the State to provide and maintain public bath-houses; but the State sets the example of bathing those who are her immediate wards, and in doing this points out the way to the lesser corporations in her bounds. Where the number of people living together, as in cities, will warrant it, a tax could be very properly levied to erect a sufficient number of public baths, at which the small admittance fee charged would accommodate the laboring classes. In foreign countries, this is adopted with success.

Trusting that this beginning of investigations upon the bath by this board will serve to call public attention to its importance, the committee respectfully submits this report.

PERSISTENCE

IN EFFORTS TO

RESUSCITATE THE DROWNED.



—BY—

ROBERT C. KEDZIE, M. D.,

PRESIDENT OF THE

STATE BOARD OF HEALTH,

And its Committee on Accidents and Special Sources of Danger to Life and Health.

PERSISTENCE IN EFFORTS TO RESUSCITATE THE DROWNED.

BY R. C. KEDZIE, COMMITTEE ON ACCIDENTS AND SPECIAL SOURCES OF DANGER
TO LIFE AND HEALTH.

Three years ago this Board issued a bulletin for the treatment of the drowned. This bulletin has been widely distributed by this Board, and it has been republished by many papers in our State. It has been adopted by other State Boards of Health and by city Boards of Health. It has thus secured a wide dissemination in our country. How much good has thereby been secured, it is impossible for me to state; but I have good reason to fear that *life is often sacrificed because energetic efforts at resuscitation are abandoned too soon*. I desire once more to urge upon the public *the duty of persistent efforts to resuscitate the drowned*, and to repeat with emphasis one direction of the bulletin, “Do NOT GIVE UP TOO SOON; *you are working for life. Any time within two hours you may be on the very threshold of success without there being any sign of it.*”

I know of no better way to impress upon the public the desirability of such persistent efforts and the criminality of neglecting them, than to give well authenticated cases which exhibit the benefit and success of such persistent efforts, even when many persons would say that all efforts are useless. The efforts which are successful in restoring a human being to life certainly are not useless, and it is wicked to refuse or neglect to make such efforts unless the absolute certainty of death is established. It is not enough to say that the person *appears* to be dead. Persons who gave no signs of life for a long time after being taken out of the water have yet been brought to life by appropriate efforts. I most earnestly protest against treating the drowned as dead merely because they appear lifeless. I am fully persuaded that many such persons die because no adequate efforts are made for their recovery. Persons may swoon and for the time appear to be dead, but we do not assume that they are dead and leave them to their fate, but make energetic efforts to restore consciousness. No more should we assume the fact of death in the drowned, but should make like efforts to restore them to life.

CASES ILLUSTRATING THE BENEFIT OF PROLONGED EFFORTS AT RESUSCITATION.

I. Rev. A. Ten Brook, librarian of the State University, communicates the following remarkable case in a letter to Dr. Baker, Sec. of this Board. "The wife and daughter of Dr. Rufus W. Griswold were on the R. R. train which ran into the river at Norwalk, Ct., May 6, 1853. Fifty-one persons were killed, and large numbers variously injured, so that the medical gentlemen were fully employed. Among the apparently hopeless cases was the young daughter (about 13 years old) of Dr. Griswold. Besides being apparently drowned, she had received severe bruises in the fall, and in the estimation of the physicians, showed no signs of life whatever. A stage-driver who desired to make himself useful, attempted her resuscitation, and persevered in the attempt without apparent success until the physicians laughed at him, asking him what he intended to do with 'that dead body.' The disaster occurred at a little before 11 o'clock A. M. It was late in the afternoon before any decisive signs of life appeared,—I think about 5 P. M.,—and for several days she was in a comatose sleep, but she entirely recovered after a time."

In this remarkable case the person showed no decisive signs of life for some six hours after being taken from the water, and yet was finally restored to life. Many persons will dismiss this case with the simple remark that "it is a very unusual case." It is unusual, mainly in the persistence of the stage-driver which even provoked the laughter of the doctors. "Let him laugh that wins!" If a like persistence were exhibited in other cases of drowning, would not such "unusual cases," become more common?

II. The following cases of resuscitation in cases of suspended animation are from the pen of a well known and highly respected sanitarian, Dr. Beech. The resuscitation of the person who hung himself, belongs to the same class as those strangled by water. It is a good example of successful treatment in a case usually regarded as hopeless.

COLDWATER, MICH., Sept. 16, 1877.

R. C. KEDZIE, M. D.:

DEAR DOCTOR,—Your communication, in which you ask for particulars of "cases of suspended animation in which resuscitation occurred after an unusually long period had elapsed, or after efforts had been abandoned," came to hand in due course of mail; but I have not been able to refresh my mind in regard to a very interesting case in point until this morning,—my informant, Mr. Ezra Card, having been absent when your letter was received.

On the 4th of July, 1860, by the upsetting or sinking of a pleasure boat upon "Clear Lake," in Steuben Co., Ind., a number of persons were precipitated into the water about one-half a mile from the shore, and several were drowned. Among the apparently lifeless bodies taken from the lake was that of Miss Mary Bryan, aged about 18 years, the daughter of a farmer of Scott township in said county. The usual efforts then known to the people were used to resuscitate, and, as my informant believes, as thoroughly as in other cases, successful and unsuccessful. The family residence was about five miles distant, and when hopes of her recovery were abandoned, the body was as quickly as possible put into the wagon (a common farm wagon without springs), and covered with blankets or shawls, and the friends started for home. The road was pretty rough, and the driver made as much haste as was decent with his mournful freight. They had proceeded about two and one-quarter miles, when signs of life were observed, and the young lady ultimately recovered. The motion of the wagon was believed to be the sole agent of resuscitation.

The tenor of your theme induces me to send you a statement of a case of *long suspended animation* which has never heretofore been recorded except in my account books, to wit: The M., male, aged about 20 years, weighing about 160 lbs., an epileptic from childhood, in a fit of despondency hung himself in his father's barn, in the town of Gaines, Orleans Co., N. Y., in 1847. He was discovered by his mother, sus-

pended by the neck with the feet near the floor, or, perhaps, with the toes resting upon the floor, but bearing none of the weight of the body. The body was perfectly limp and face turgid. Her screams brought the father from the house, which was 10 or 12 rods distant, who, as he ran, got his pocket knife open, and severed the rope at a stroke. Some of the family screamed something about "the doctor," and a man ploughing near the barn, threw the harness off one of his plough-horses, and as he passed the barn learned the essential fact, and rode to my house as fast as possible. The distance between the houses was a few feet over one mile. I was, at the moment, entirely disrobed, taking a bath, but heard the man tell to some of my family that "The M. had just hung himself." I called out, "Tell him to leave his horse for me, and get mine," and dressing as quickly as possible—mounted the farm-beast and ran her home,—having to rise a small hill. On arriving at the barn I could discover no signs of life.

I satisfied myself that the neck was not "broken," and throwing a silk handkerchief over the face proceeded to inflate the lungs from my own, alternately depressing the "chest."

This having been continued until it seemed extravagant to hope for success, recalling to mind his *hyperæmic* diathesis, I ligated an arm, and opened a vein with a liberal *slash* of the tissues covering it. Only a drop or two of very dark and thick blood followed. Setting the assistants to rubbing and squeezing the fore-arm, I returned to the work of artificial respiration.

I think that I should not have tried to inflate the lungs again, when a person at work at the arm remarked "we can milk the blood out faster," and I saw that the forced jets were lighter colored. I then renewed the inflations two or three times, getting a "big chested" farmer to furnish the breath, whilst I manipulated the larynx. Having waited, after a strong inflation, what seemed to me a pretty long time before compressing the thorax, I was cheered by a slight inspiratory catch, and the exclamation from our *Hæmagogue*, "see how it runs."

A gradual but perfect recovery followed. The epileptic seizures returned, and the suicidal mania, after several other failures, became triumphant two or three years after.

The data from which time may be estimated must convince any one that the recovery was remarkable, and it excited no little wonder in the vicinity at the time.

Resumé.—A heavy man suspended by the neck by a rope in slip-noose, motionless and limp when discovered. At the alarm given, an old man runs 10 or 12 rods and cuts the rope; after this the harness stripped from a plough-horse, and the animal led 30 rods or more, a pair of bars and an unhandy large gate to open,—the animal run a full mile,—the doctor to dress, and ride the jaded beast the mile, up some sharp rising ground, dismount at the gate and run nearly 20 rods before the work of resuscitation was commenced. Already the bystanders were confident of entire death. The protracted and varied efforts seeming so futile and finally triumphing.

After receiving the foregoing letter, I wrote to Dr. Beech for the particulars of another case of resuscitation after the body had been a long time in the water, and received the following letter in reply:

R. C. KEDZIE, M. D., etc., Lansing, Mich.:

DEAR DOCTOR,—I cannot just now find the exact date of the case of protracted drowning and resuscitation of the child alluded to in your last letter, but the circumstances are so perfectly distinct in my memory that I do not hesitate to vouch for the facts, upon which any person can make an approximate estimate of the asphyxiated condition.

On an afternoon in summer (of, I think, 1845), Mrs. Nahum Anderson, of Gaines, Orleans Co., N. Y., gave to each of two children (a nephew about 4 years old, and her little daughter, about 3), a "fried-cake" which they commenced to eat, and ran out of the door, across a wide platform—as she supposed, into the garden. She then took her babe from another person,—sat down and nursed it until it went to sleep,—and laid it in the cradle.

When the babe was put down, a sister of Mrs. A., who was there for an afternoon visit, said that her husband would be home from work by the time that she "could get home and get his tea," and asked that her little boy, aforementioned, be called. Mrs. Anderson went to the door and called to the children. Whilst waiting for them to come, she stepped out upon the platform, near the middle of which was the opening to a large cistern. Seeing the cistern lid balancing upon two corners, she re-

marked. "How careless this cistern is left." Just then the little boy came near, and when asked "Where is Phebe-Ann?" answered, "She didn't come out." Mrs. A. touched the lid alluded to, with her toe, and as it poised downward, saw some pink calico in the water, and saying, "Here is Phebe-Ann's bonnet, now," coolly took up the long wooden hook used for drawing water and reached for the supposed bonnet, thinking that the girl had gone into the woodhouse, where there were other persons. Catching into the calico, she found it to be the apron, which was like the bonnet. Upon raising it, the sad fact appeared, and the hold of the hook slipped as the body came to the surface of the water. The discovery—the slip of the hook—and a scream from the mother were simultaneous. The grandfather of the child, who was in the chamber nearly over the platform, heard the scream,—had to pass through rooms and down a long flight of stairs to the front of the house, then back through the hall and dining room to the platform, where the mother was ineffectually trying to raise the body with the hook.

The old gentleman jumped into the cistern and handed the body up. As it was lifted out, the women called to a slow-witted and slow-motioed fellow who was at work in the wood-house, to "run for the doctor," and he set out for my house, a half mile distant, with the apathetic pace of an imbecile.

A neighbor across the road, who was ploughing full forty rods from the house, heard the outcries, and listened until he heard the word "doctor," and saw the man start, when he pulled the harness from one of his horses, and with the halter rode to my house. The footman had arrived before my open door, and had panted out, "Doc-t-o-r Be-e-c-h, Mister An-d-e-r-s-o-n's f-o-l-k-s"—when the neighbor rode up exclaiming, "For God's sake, Doctor, go to Mr. Anderson's quick as you can! Something dreadful has happened, and this fellow never can tell it." I— "Let me have that horse," and the doctor, in slippers, was soon astride,—with saddle-bags in front,—plying the halter's tail right and left, as far as the animal's home, whence, knowing the improbability of guiding farther with the halter, I slipped off and had to run about 30 rods, crossing a brook-bridge, which was about six feet lower than where I dismounted, and from which there was 10 or 12 feet rise to Mr. A.'s house.

I found the grandfather holding the inanimate child, turning it alternately upon its face and its side. I immediately inflated the lungs from my own, and continued efforts at artificial respiration,—warm blankets, etc., to the body and limbs,—and bottles of hot water wherever they could be applied. The messengers had both returned on foot some time before we were rewarded by signs of life. But the tardy reward came: A quiver, a gasp, and finally independent respiration, but consciousness had not returned, when the breathing became slower, moaning, then stertorous.

Whilst I,—then a young doctor,—was trying to collect my ideas to meet the new danger, the grandfather said, "Doctor, she is going to die *now* of apoplexy." (To which the family was predisposed.) The remark gave me a thought,—an *anæmic* brain and a congested brain may produce similar symptoms. *We had not warmed the head.* Wrapping it instantly with a very hot flannel cloth, I continued to change for hotter as fast as they cooled until the stertor ceased and consciousness returned.

My patient was feeble for a long time, but is married and has children, now "in their teens." The cake aforementioned was found in the cistern with only *one bite* taken out of it.

The mother and friends tried repeatedly to compute the time, and became convinced that there was complete asphyxia *more than* 45 minutes, and that it was probably nearer 55 minutes. The depth of the water in the cistern was equal to the full length of the child, and the distance fallen before striking its surface was about six feet.

If the cases which I have detailed interest yourself sufficiently to repay you for perusal, or contribute to the objects of your paper, I shall be gratified; and wishing the "State Board of Health," a full appreciation of its labors,

I remain, very respectfully,

Yours, etc.,

Coldwater, Mich., October 6, 1877.

J. H. BEECH, M. D.

III. The following case of what may be called accidental recovery is furnished by J. W. King, of the Lansing Republican. In this case, as in the case of Miss Bryan, given by Dr. Beech, apparent death would have become real death but for the rough handling which promoted recovery:

In the year 1855, in the town of Richland, Kalamazoo county, a son of a blacksmith named Blanchard, was drowned in a pond about 30 rods from his

father's house. The parents were away from home at the time. A younger brother saw him sink, ran to the house and alarmed his sisters. The oldest girl, about 16 years of age, hastened to the pond, waded to the spot where her brother went down, recovered the body and carried it ashore. The drowned boy was about 12 years old, and she could not carry him to the house. The family had been in the habit of doing their weekly washing at this pond. A pounding-barrel was near at hand and she conceived the idea of putting the body in the barrel and rolling it to the house. With the aid of the other children she put the body in the barrel and rolled it to the house. When they reached the house they were surprised to find their supposed dead brother vomiting, and he soon recovered his usual activity.

IV. Mr. Andrew Bertch, of Lansing, gives the following illustration of the benefit of rough handling in recovering the drowned. The case came under his personal observation in Germany. A boy some 12 or 13 years old was skating on a pond when the ice broke, and the boy passed under the ice and sank to the bottom. Much time was consumed in ascertaining the position of the body, and when it was found a long time elapsed before the body was recovered, on account of the ice breaking under those who attempted the rescue. When taken out of the water the boy appeared to be entirely dead,—the long submersion in ice-cold water appeared to have blotted out the young life. The boy was so evidently dead that no efforts at resuscitation were made, but the peasant boy's companions proceeded to carry him home, a distance of more than two miles. In carrying him that distance the body very naturally received some rough handling, being hustled along as far as one set could carry him, then dropped by this set to be picked up and carried by another set of boys. As the result of this rough handling, by the time the boy reached home he began to vomit water very freely, and speedily recovered. He is still alive.

Mr. Bertch gives another instance which occurred in the same neighborhood:

A lad, the only son of wealthy parents, fell into a stream and was submerged for only a few minutes. The body was tenderly carried home and carefully placed on a soft bed; medical aid was speedily obtained, and the boy was gently and politely urged to return to life, but without success. Mr. Bertch thinks that if the rich boy had received some such rough handling as the peasant boy received, the result might have been different.

Numerous instances show that energetic treatment, what might be called rough handling, is best adapted to recover a person in case of apparent drowning. Flood's touching sentiment—

*Take her up tenderly,
Lift her with care—*

is very appropriate as a manifestation of the reverence due the human body, but this treatment is not well adapted to recover the drowned. It is better to postpone sentiment and poetry and betake ourselves in rough earnest to the task of restoring life!

V. Mr. Albert Gould, of Lansing, has furnished me the following suggestive statement of cases of resuscitation of persons apparently drowned. In Erie Co., N. Y., in June, 1863, a party of school boys went to a small pond "to go in swimming." The pond was usually so shallow that boys who could not swim could safely play in the water, but a recent rain had increased the

amount of water till it was about five feet deep. The boys did not observe this dangerous increase in the depth of the water, and two small boys who could not swim, undressed and plunged into the water and began to drown at once. A third boy, who could swim, plunged into the water to rescue the drowning boys, but he was at once seized by them and dragged beneath the surface, and the danger was imminent that all three would be drowned together. The other school-boys raised a cry of alarm which was heard by Mr. Gould, as he was driving in the road some forty rods from the pond. He left his horse and ran to the pond where he found one boy still struggling in the water, one floating in the water, and one lying at the bottom,—these two apparently dead. Mr. Gould plunged into the water, threw out on the ground the boy that was struggling in the water, drew the floating body to the land, and then dove to the bottom and brought up the third boy. He threw the body of this apparently dead boy on his shoulder, the abdomen resting on his shoulder while the head and limbs hung down limp and lifeless. Gould then started *on the run* for a house some forty rods away; the movements in violent running served to produce a kind of artificial respiration; also, to expel water from the lungs, and as he laid the body across the fence which he had to climb to reach the house, he saw the first sign of life in a feeble gasp for breath. The boy was taken into the house and every appliance used for his restoration, but it was four hours before he was restored to consciousness.

As soon as Mr. Gould had got this boy to the house, he ran back to the pond for the other boys. The boy first taken out had so far recovered that he required no other care and assistance than what the other boys could give; but the second boy taken out of the water still lay on the ground apparently lifeless. Mr. Gould shouldered him in the same way and again started on a run for the house. When about half way to the house, water very freely gushed from the boy's mouth, he vomited freely, and speedily recovered.

Any person who studies these cases will not fail to see that the rough jolting which the boys received while being carried on the shoulder of a man running violently, greatly promoted the recovery. If this accident had occurred near the house, and the bodies had been carefully lifted upon the bed, and the usual chafing and rubbing, the application of hot cloths to the feet, and the other customary exhibitions of aimless helplessness had been brought into play, these boys would probably have died; while a little undesigned but most fortunate rough usage saved their lives. "The kingdom of heaven suffereth violence." So far as the recovery of the drowned is concerned, "*the violent take it by force.*"

In 1874, Mr. Gould, with a gang of hands, was booming pine logs in Maple River. Some boys came to the river to play on the saw-logs. One of the boys slipped into the river, was carried under the logs and soon sank to the bottom. Mr. Gould dove under the logs, seized the boy, brought him to the surface, climbed upon the logs, threw the boy across his left arm, the abdomen of the boy resting in the hollow of Gould's elbow, and then he jumped from log to log till he reached the shore. The concussion produced by these leaps caused a free escape of water from the lungs and restored respiration, so that the boy began to breathe before he reached the shore.

I bring these cases before the public to show how dreadful and even fatal is the assumption, because a body removed from the water *appears dead*, that death has really taken place. I fear that many in our State have died because energetic efforts at resuscitation were neglected because the body appeared dead.

Statements like the following too often meet my eye in the public prints: "When the body was taken from the water it showed no signs of life whatever, and the mourning friends tenderly conveyed the body to their stricken home." Perhaps too tenderly!

It is not enough to assume because the patient does not kick or scream, or even gasp, that therefore he is dead. But from what I occasionally see in the newspapers it would seem that even visible signs of life are not always sufficient to arouse the stupid bystanders to make effort to save the drowned. I insert without note, comment, or exclamation point, the following extract from the Detroit Free Press of July 19, 1877:

"It seems strange that noted and crowded watering places are not better provided with life-saving apparatus and proper medical aid, where hundreds are bathing every day—especially as nearly all those who seek the sea waves are from inland cities, or at least have little experience with water. At Atlantic City two lives were lost recently, and from all accounts both might have been saved if proper appliances had been at hand, as they floated for nearly half an hour only a few rods from the shore; and even after being brought out of the water the astonishing statement is made that they showed signs of life for an hour. But proper medical aid not being on hand, both perished."

HOW NOT TO DROWN.

How to drown is an art that seems to be well understood and frequently practiced the world over. How not to drown is an art not so well understood, and requires some notice at the hands of this Board.

Drowning could be prevented if we could secure either of the following conditions: 1st, that everybody should know how to swim; 2d, that nobody should ever go into the water. But as we cannot secure either of these conditions in the present order of things, we turn our attention to some means of reducing these accidents to their minimum of danger.

Much good advice is often thrown away upon persons who find themselves suddenly thrown into the water: "keep cool;" "do not lose your presence of mind," etc. The conditions are very favorable to follow the first advice in a literal sense, for the water itself will assist one to get cool and to keep so indefinitely; but when a person is suddenly compelled to face death in an unexpected form, the advice to "preserve your presence of mind" is usually driven out of the mind by overwhelming terror, and the person too often becomes *absent minded* in an awfully literal sense of the word.

The solids and liquids of the body are all heavier than water, but the living body, on account of the air in lungs, stomach, and bowels, is slightly lighter than water; and so long as these cavities remain filled with air, the body will float in water and a small part of the body can be kept above the water. While it is true that so long as the lungs, etc., are filled with air, the body is lighter than water, the difference in specific gravity is small, and only a small part of the body will float above water. What part will be above water depends upon the relative position of other parts of the body; if the legs are flexed and the arms thrown in front of the body, the centre of gravity is in the anterior portion of the body, and the top of the shoulders and back of the head only will be above water; the face being under the water, respiration will be impossible under such circumstances. But if the legs are straightened out and the arms thrown behind the body, the face will be brought above the water. In the

attempt to float, therefore, *the legs should be straightened out, the head thrown back, and the arms held behind the body*; the face will then float above the water so long as this position is maintained. If one part of the body is thrown out of the water, a corresponding amount of the body will be submerged; if the arms are held out of the water, the head will go under. I remember the case of a boy who thought he would greatly increase his power to swim by tying an inflated bladder to each foot, but when he entered the water he came near drowning, because his feet were kept out of the water but his head under water; and he soon became practically convinced that it was important that his head rather than his heels should be in air.

If the mouth and nose are kept above water, respiration may go on without interruption, and life may be sustained indefinitely under such circumstances. This may be secured in still water by merely floating with the face upward, every other part of the body being kept constantly under water. But with very little exertion a person may do more than keep his nose above water, even if he is ignorant of the art of swimming. I have seen persons "tread water" by making the same movements with the legs as in walking up stairs, and thus keep the entire head out of water for a long time. If a person will add to this certain corresponding movements of the hands—in fact, *make the same movements of both arms and legs that he would in climbing a vertical ladder*, but without lifting his arms out of the water and without closing his hands in the downward movement of the arm, he may keep his head out of the water even when the waves are running high, and may keep from drowning for hours. Whenever a person finds himself in the water and in danger of drowning, let him assume as speedily as possible a vertical position and at once begin the same movements as in climbing a vertical ladder—*let him climb for life*—and he will be surprised to find with what slight exertion he can keep his head above water; let him be satisfied with this, for he may exhaust himself in vainly attempting more.

The following communication by Dr. MacCormac of Belfast, to the Sanitary Record of July 13, 1877, on "PADDLING THE WATER AS A MEANS OF AVERTING DROWNING," is inserted as imparting valuable information on this important subject:

"Already the fine season has been ushered in by a number of deaths, some of them occurring in our very midst, from drowning. The means of safety, or relative safety, which I have to point out, are so very simple, and as I believe, so effective, that I am lost in wonder that no one has thought proper to insist upon them, as in the following remarks it is my intention to do. Swimming, as ordinarily practised, is not the most sufficing means for escaping the dangers of the water. It needs some instruction to be able to swim, and practice to be able to swim well. No doubt it is desirable to swim and to swim well. But the great majority of persons of both sexes do not know how to swim at all. Yet unless people can swim, and swim well,—and even then they are not always successful, when the emergency comes, in preserving life,—swimming is, I am persuaded, not so effective a preservative as is conjoint paddling and treading water. As a rule, subject to few exceptions, persons precipitated into the water do not swim without previously learning. But paddling with the hands and treading with the feet require no prior instruction, and in the great majority of cases would save life. In swimming, the mouth is on a level with the water in the intervals of the strokes; in paddling, the head is well elevated; the individual is able to look about; he can deliberate as to what is best to be done,

and he is much less liable to take water into the larynx or glottis, a casualty which, I am persuaded, causes the destruction of many. Without prejudice to the art of swimming, I would have children exercise in household tanks from the tenderest age, in the act of paddling and treading water, so as to impart the confidence which unreasoning dread tends to lessen or take away when one is suddenly immersed, in an unusual medium. The animal, the quadruped, begins to paddle at once when cast into water, but as man does not habitually employ the anterior limbs as organs of locomotion, reason must tell him that he may, if he pleases, employ them as organs of locomotion in the water, just as readily as any fourfooted animal. To be sure a man has not the habit of using his hands and arms for locomotion, as the brute has, but otherwise how much more available is the paddle-shaped hand than a hoof or a paw. Again, the man with little or no instruction, by throwing his head well back, can float and rest at pleasure, a thing of which the brute has no conception whatever."

"Of course, a little preliminary habitude is desirable, but without any preliminary habitude or instruction whatever, there is nothing to hinder man, woman, and child, were they unable, in common parlance, to swim a stroke, from beating water with the hands and feet, just as the lower animals do, and so keep themselves afloat for a protracted period, a period that in a multitude of instances would be found sufficient to invite rescue and preserve life. The action of the feet down will sustain the body. The action of the hands down will do so; *à fortiori*, the action of both will prove yet more effective. I have tried myself; one alone, or both together,—nay, with a single hand only,—in bygone years, I am sure, hundreds of times. There is no occasion for fuss or bustle. The body, taken as a whole, is actually lighter than water, bulk for bulk, and a very moderate amount of paddling with feet and hands, will be found perfectly adequate to sustain and guide its movements. In fact, so long as the individual paddles, as I here direct, he cannot sink. A horse, or dog, or cow, or cat, or swine, when immersed in water, begins instantly to paddle, and that without any prior instruction or exercise whatever. Now, a man, or woman, or child has only to do as the inferior animal does, and he, she, or it will float necessarily and inevitably. The place being otherwise safe and boats at hand, boats' and ships' crews, a regiment of soldiers, schools, and the like might jump into deep water and paddle themselves into security without risk or failure. In this, as in many other things, man is too often unaware of his own immense capacities."

"Animals not habituated to the water, will often take to it spontaneously, or, if cast into it, sustain themselves for indefinite periods. A horse, during disembarkation in Portugal, fell into the sea and paddled about the harbor for a matter of six hours before it was secured. Washed or thrown overboard, the lower animals have been known to float for a long time. I knew of a mule, which, having been washed overboard in the Bay of Biscay, paddled itself ashore, and then crossed country a couple of hundred miles to its previous quarters. The staff-surgeon in charge told me that, after leaving the Peninsula, the horses of the troop had to be thrown overboard in order to lighten the ship in a gale. The poor things, when they found themselves abandoned, faced around, and, so long as the ship commanded a view, were seen to battle with the wrack and wash for miles. A man on the coast of Lincolnshire, mounted on a gray mare or other horse, used to swim seaward to vessels in distress, and thus rescued many lives. Recently, nigh Brooklyn, U. S., a dog took the water and paddled, it is said, forty miles in search of his

master. Dogs often gain the shore when ships and their crews have been lost. Some years ago a dog landed at the Cape of Good Hope, with a letter in his mouth. The vessel to which he belonged had gone down with all hands; but if the men had paddled as the dog paddled, all their lives might have been preserved. Indeed, I know for certain that formerly it was the practice at the Cape for men to paddle out, it was termed "treading water," and bear communications to and from vessels in the offing, where no boat could live. It was, and I believe is still, the case at Madras, similarly. Natives at the island of Ioanna, in the Mozambique Channel, treading water, come out, bearing fruit on their heads to the vessels, miles distant. The young people in the islands of the Pacific, breast the gigantic breakers out of mere sport. The Indians of the Upper Missouri traverse the impetuous current, invariably paddling and treading water."

"Short instructions for paddling and treading water ought to be posted up in all schools, barracks, and bathing places; wherever, in short, people have to do with the sea or with masses of water. It should be shown how easy it is, with a little well-directed effort, to preserve life, and how the yearly and calamitous destruction which besets our shores might, now, and happily for all time to come, be effectively stayed."

One precaution is necessary for a person who is paddling and treading water, to avoid strangling; when cold water is suddenly dashed in the face, an automatic or involuntary inspiratory effort or "catching the breath" is caused, and if the face at the instant is covered with water, strangulation from drawing water into the lungs is the result. When waves are dashing in his face, the person must guard himself against this spasmodic inspiration by holding his breath at such times, or he may even grasp his nose and close his mouth with one hand and thus prevent the possibility of strangulation.

STATE AGRICULTURAL COLLEGE, October 8, 1877

THE WATER SUPPLY
Of Localities in Michigan,
AND ITS
RELATIONS TO HEALTH AND DISEASE,
IN SOME OF THE
TOWNSHIPS, CITIES, AND VILLAGES THROUGHOUT THE STATE;
BEING REPLIES BY
REGULAR CORRESPONDENTS
OF THE
STATE BOARD OF HEALTH,
TO ITS
CIRCULAR No. 7.

Arranged for publication by the Secretary of the Board.

THE WATER-SUPPLY OF LOCALITIES IN MICHIGAN.

In the Sanitary Survey of a State, the collection of facts relating to the Water-Supply in different parts of the State, is now recognized as of importance. The collection of such facts respecting the Water-Supply in this State, begun in 1875, has been continued. The circular which in October, 1875, was issued by this Board was replied to by quite a number of the regular correspondents; and such replies, received up to November, 1876, have been published in the Annual Reports of this Board for the years 1875 and 1876. Since the publication of the last Report, the Board has secured quite a number of new correspondents; and many of them have kindly sent in replies to the circular which asked for facts relating to the Water-Supply. This makes it possible for the Board to continue to place on record information on this subject. It is hoped that in this way the statements may eventually be so complete as to give a very satisfactory view of the State as a whole, and also enable one to form a useful idea of the special conditions in any part of the State.

No compilation has yet been attempted, but it is thought that there are now, or soon will be, sufficient data collected to enable one, by carefully compiling the answers to the several questions in the circular, to make quite a number of useful general statements.

In this Report, as heretofore, the replies by correspondents are published in the order in which they were received and filed. The circular is also printed, because the questions are not repeated in the replies, but are only referred to by number.

H. B. B., *Sec.*

[7.] CIRCULAR TO CORRESPONDENTS, RELATIVE TO WATER-SUPPLY.

OFFICE OF THE STATE BOARD OF HEALTH, }
LANSING, MICHIGAN. }

To the Correspondents of the State Board of Health:

GENTLEMEN:—Dr. Arthur Hazlewood of Grand Rapids, a committee of this Board on "Food, drinks, and water-supply," desires to collect information relative to the

water-supply throughout this State. Will you have the kindness to send, as soon as convenient, to the central office of this Board at Lansing, your responses to the following questions? In your reply it will not be necessary to repeat the questions, but simply to refer to them by number.

1. Are you located in a city, village, or in the country?
2. From what source is the chief water-supply of your city, village, or locality?
3. What relation does the water-supply sustain to the drainage and to the sewerage of your own or of some neighboring city, village, or locality?
4. If there is close relation with sewerage, of what does the sewage consist?
5. If the water is taken from a stream, what is the rapidity and direction of the current; is it constant in direction; if not, what affects it, and what are the usual conditions?
6. From what distance is the water brought?
7. In what kind of conduit?
8. To what extent is it accumulated in settling or other reservoirs?
9. Is any process for filtering or purifying used, besides reservoir settling?
10. What is the average amount of water flowing into receiving reservoirs each day?
11. What is the average amount of water consumed each day?
12. How many gallons daily to each inhabitant?
13. To what extent is water from artesian wells used?
14. To what extent is cistern water used?
15. Is it filtered before storing?
16. Is it filtered before use?
17. Of what material are the cisterns constructed?
18. To what extent is spring or well water used?
19. In that part of your city, or in localities where well-water is used, what is the character of the soil?
20. What is the usual depth of the wells?
21. What strata of earth are passed through?
22. State, if you can, in what direction the strata dip?
23. State, if you can, the nature of the stratum which underlies and maintains the water in the wells?
24. What is the usual distance between the well and the nearest privy?
25. What is the usual distance between the well and the nearest cesspool?
26. Please give details of any cases of marked exception within the distance named in answer to last two questions?
27. Are the water-works, cisterns, springs, or wells so located and constructed that there is no danger that the water therefrom may be subject to sewage, cesspool, or other contamination?
28. Has the water supplied by water-works, cisterns, springs, or wells been offensive in taste or odor at any time? If so, at what time, and what was the cause?
29. Have any analyses of water in your locality been lately made? Please send results of all analyses.

30. Except where results of analyses are sent, please state your opinion of the quality of the water from the water-works, wells, cisterns, artesian wells, etc. Is it clear or turbid; does it probably contain organic matter in dangerous form or amount; is it hard or soft?
31. What have you observed as to the contamination of water by decomposition of wood, pipes, pumps, curbing, etc., at or near the surface?
32. What, as to lead or other metal derived from pipes or vessels with which the water has been in contact?
33. What have you observed as to the influence of rainfall, freshets, or drought upon the purity or healthfulness of the water-supply?
34. What relation between the water-supply of any of the inhabitants, and the graveyards of your locality?
35. Please give details of any cases of sickness which have occurred which could be fairly attributed to drinking impure water, or to its use for other purposes?
36. Please give a statement of any apparent influence, due to quality of water used, upon cases of epidemic or other diseases originating from other causes?

After sending in your response, please preserve this circular, as a memorandum of some of the points connected with this subject upon which this Board desires to hear from you hereafter, whenever you have anything of interest on the subject to communicate.

By direction of the State Board of Health.

Very respectfully,

HENRY B. BAKER,

Secretary.

REPLIES BY J. W. FALLEY, M. D., OF HILLSDALE, MICH.

Secretary of the State Board of Health:

DEAR SIR:—I send replies to the questions in your circular, as nearly as I am able to do.*

1. City,—Hillsdale.
2. For culinary purposes and drink, from wells. The St. Joseph River runs through the city,—originally a marsh some 25 rods wide, now nearly filled and built on. The land on either side rises to 40 or 50 feet.
3. The St. Joseph River rises in, or is the outlet of Baubeese Lake, about one mile east of the city. All drainage is into the river.
4. Stone gutters at sides of streets.
5. Flows steadily north-west.
6. We have one flowing fount. The water is brought three-quarters of a mile from a spring on a hill, in iron pipes. Good.
7. As above.
8. No settling reservoirs. Have some 10 cisterns, at different points, holding from one to two thousand bbls. each.
9. Know of none.
10. Have a windmill well on highest ground, and pipes from one cistern to several of the others. Some are filled from public buildings, or from the river with engines.
- 11, 12. Do not know.
13. We drilled two, 1,600 feet each, and got *stuck* in each one. We use one, a *public* pump, and the other for the windmill.

* The figures beginning paragraphs refer to questions in Circular 7, printed on pages 146-7 of this Report.

14. Everywhere for washing, etc.

15, 16. Not much, I think.

17. Common cement; either walled with brick or plastered on to the dirt.

18. For culinary and drinking purposes, except by those who use from the fountain.

19. South-west of the St. Joseph River the soil is gravel with some clay. Five or six feet [below surface?] we find shale sandstone. That increases, so that some of the cellars have rock bottoms. From that down it is sandstone for, I think, about 40 feet. There is a break in the geological formation at the river. On the north-east side the soil is gravel. Wells usually 40 or 45 feet in gravel. I had one that depth (45 feet), for 22 years. Then a man 30 rods away and far below me (30 feet) tapped my vein, and dried my well, in April four years ago. I bored 15 feet through blue clay and struck a streak of gravel, put in an iron pump with filter on end, and have had plenty of water (60 feet). Two wells have been *driven* (iron pipe) in the center of marsh near the river; at 30 and 32 feet they struck gravel, and got cold, pure water.

20. On the flat, either side the marsh, 15 and 20 feet gives water not cold or good, surface water; 30 to 40 feet gives good water. Other places vary from 40 to 80 feet.

21. On the south-west side, where the holes were bored, the first, about 40 feet, was sandstone. Then for 1400 feet we had a kind of soft slate, with an occasional stratum of a few feet of much harder rock. The concerns stopped in a slate as soft as clay. We did not know enough to tube, and so lost our holes.

22. North-east.

23. Gravel on north-east side. Found in the seams of the rock on the south-west side.

24. I think it will average five rods; in some cases, less.

25. We don't keep the article.

26. One, in the rear of Underwood's block; privies for four stores and tenants above, well about four rods and down hill from the privies. The water may be good, but I will not drink from it. When the rock lies in broken strata, as it does here, where a stream may go rods without passing through scarcely any earth, I am suspicious of wells anywhere near privies. My office is on the same side of the river, and I seldom drink until I get home, except at our public well, which is ten rods from any privy. At our county house, where we average at least 70 persons the year around, we have three privies. A few years ago I had them built without vaults, open on back side, and every week or two have the contents drawn away and buried. Of all stinks, an old privy is the least refreshing.

27. It is—or they are.

28. I am not aware that it has:

29. Not any.

30. Clear and good—hard. Lime, so as slightly to coat kettles.

31. Very little; all wells stoned or bricked. Mostly iron pumps.

32. Little lead piping used, except in cisterns. Iron pumps. Though I consider the water from them healthful, often medicinal—on account of the iron held in the water—yet I think it well to pump a pailful first and throw it away, if the pump is not quite often used.

33. In our place it has little effect.

34. The cemeteries are sufficiently away, and harmless at present.

35. I can recall only one case, where there were five cases of typhoid fever in one family, extending over five months of time. The well was shallow and near the barn. That was six miles in the country.

36. Some years ago the condition of the flat along the St. Joseph, and a milldam were supposed to have a vast deal to do with sickness (malarial); but that has passed away—I mean the nuisance—and the sickness is not.

Thus I have imperfectly answered the interrogatories.

Most respectfully yours,

Hillsdale, Nov. 2, 1876.

J. W. FALLEY.

REPLIES SENT BY DWIGHT NIMS, M. D., OF JACKSON, MICH.

Answers to questions in circular of October, 1875, so far as they relate to water-works: *

10. From artesian wells; 30 feet drift, 170 feet sandstone.

10. Two six-inch wells are available for from 1,000,000 to 1,250,000 gallons per day.

11. 600,000 gallons.

* The figures beginning paragraphs refer to questions in Circular 7, printed on pages 146-7 of this Report.

12. Population, 15,000.

27. Contamination impossible.

29. Chloride of sodium, 4.6852 grs.; sulphate soda, 1.2370; carb. lime, 8.2503; carb. magnesia, 3.2499; alumina and oxide of iron, .1296; silica, .8417; free carbonic acid, 3.6659; traces of nitric and phosphoric acid, ammonia and potassa.

33. Free carbonic acid acts so readily upon iron that now no new service pipes are permitted to be laid except of lead,* or coated iron pipe.

CYRUS H. FOUNTAIN,

Superintendent of Public Works.

Jackson, Mich., Nov. 1, 1877.

REPLIES BY JOHN S. CAULKINS, M. D., OF THORNVILLE, MICH.

Secretary State Board of Health:

DEAR SIR:—Circular 7 was received to-day, and below please find my replies to its queries.†

1. In a small village.

2. The drinking-water is mostly supplied by wells. There are some running springs, and a few cisterns. The Summers for five years past have been dry, and some families, in consequence of the failure of their wells, have been compelled to use river-water.

3, 4. The surface of the country is rolling, and there is no drainage but surface drainage. With that, the water supply has no *necessary* relation. In many cases, wells not properly cared for are polluted by surface water.

5 to 13. ———.

14. Cistern water is used by only a few families for drinking and culinary purposes. It is used by those that have cisterns, for washing. The country is not very well supplied with cisterns, and the large troughs that serve as substitutes for them, are excellent places to breed mosquitoes in.

15, 16. No filters.

17. Of water-lime mortar, plastered on the bank of earth.

18. Almost entirely.

19. Sand and gravel mostly; clay in some places.

20. From 20 to 40 feet. There are a few very deep wells in one locality, 90 to 100 feet or more.

21. After passing the surface soil,—10 to 15 feet of hardpan, a gravelly clay, that needs no curbing,—then sand and gravel that will not stand without curbing.

22. There is no dip.

23. The water is reached in the sand, either quicksand, or in what the well-diggers call water-sand. There is no clay or other stratum of hard nature that underlies and maintains the water in the wells. It seems to stand at a certain depth or level in the earth.

24, 25, 26. Not often very near. Perhaps five rods or even more, but there are some marked exceptions. In one case a well has been dug about 18 or 20 feet from the spot where an old privy stood for years, and where its accumulations still lie covered.

27. In such cases as the above, there must be danger of contamination.

28. It is often the case that the water in the wells is offensive to smell and taste. This is especially the case with the deep wells referred to in answer "20," and with all wells where water is found in clay, as it is a little to the eastward on the timbered land. This, in the case of the deep wells, may be owing to their neglected condition. All open wells, especially curbed ones, need frequent cleaning out. Deep wells seldom get it, on account of greater expense and risk to life.

It sometimes happens that angleworms get entrance into a well, and by death and decay in it, make the water offensive, if the well is not frequently cleaned.

In some other cases in which the water remains offensive after repeated cleanings, it is probable that there is some small animal dead among the stoning. Rats, mice, snakes, lizards, toads, or frogs are liable to fall into a well from the top, if it be not properly secured, and (if not killed by the fall or drowned, in which case they will be drawn up in the bucket) clamber among the stones and die there; or it may be, in the case of very shallow wells, that they have runways through the loose stones down to the water to get drink, and happening to die near the water's edge, infect it for a long time.

* [Lead pipe should never be used for this purpose, because of danger from lead poisoning.

H. B. B., Sec. S. B. of H.]

† The figures beginning paragraphs refer to questions in Circular 7, printed on pages 146-7 of this Report.

The safeguard against these dangers is to so construct the well that nothing can get into it. Lay the top of the wall below the depth that angleworms work, in mortar, and build the platform in such a way that no snakes, frogs, or mice can get under it. Let the frame be of sound oak timber 4x8, well bedded in gravel; cover with two layers of pine boards running the same way, breaking joints and securely nailed, and with a good inclination to shed off the spilled water. A well so constructed, and sufficiently raised above the general surface to ward off the Spring freshets, is as safe against the intrusion of organic matter as an open well can be.

The danger of poisoning the water by fungi growing on the curbing is one that we are obliged to run, as long as we use open wells. Such a well can be built, in this vicinity, only with curbing, and the tub that gives the depth of water, must be in part above the surface of the water, or otherwise the quicksand will run into it, and the well will go dry. This has been abundantly proved by experience. Our only course is to keep all organic matter out of the well-water, except what arises from the decay of the curbing, and *hope* that no fungi will grow.*

29. No analysis has been made.

30. The water is clear, hard, and generally good.

31. I have observed that the tubing of pumps (which is generally of basswood or whitewood), after standing in the well a few years, becomes covered with a black, filthy slime, which, one would think, must be quite the reverse of wholesome.

32. Have observed nothing. Lead pipes are used with iron pumps, and their effects on the health of families using them is a subject worthy of study. I will in the future give it attention.

33. Properly secured wells on the "openings" are not affected by the freshets; on the timbered lands they frequently fill up with muddy water. Observations are wanting concerning the salubrity of muddy water. No observations concerning the influence of drought on the healthfulness of the water-supply.

34. None.

35. Have no details; but two families living on the place referred to in answer "26" have had an unusual amount of sickness, consisting of obstinate intermittents and remittents, diphtheria, and one case of typhoid fever.

36. No observations.

Thornville, Mich., Nov. 11, 1876.

JOHN S. CAULKINS.

REPLIES BY A. W. ALVORD, M. D., OF CLINTON, MICH.

Replies to Circular 7.†

1. Village.

2. Wells and cisterns.

3. None.

4. —.

5, 6, 7, 13. None.

14. A few families.

15. Yes.

16. Yes.

17. Brick and water-lime.

18. Universally.

19. Gravel—loam.

20. 18 to 25 feet.

21. First, gravel for 4 or 6 feet; next, coarse sand 3 to 8 feet, the lower part a quicksand; then a blue clay stratum 2 to 6 feet thick.

22. To the south-east.

23. Blue clay.

24. 20 to 60 feet.

25. About the same, sometimes nearer.

26. One German family living in Bridgewater, a few miles north, had a cow-pen and pig-sty 13 feet, by actual measurement, from the well from which the family used constantly. On the 6th day of June, 1876, I was called to visit a boy of eleven, who had been sick two weeks already. I carried him through four weeks of typhoid fever. In the midst of this sickness an older sister, 18 years of age, was attacked, and then another, and another, until father, mother, and every one of their eight children

* [Would it not be safer to curb the wells with earthen pipe, or make tube wells?

H. B. R., Sec. S. B. of H.]

† The figures beginning paragraphs refer to questions in Circular 7, printed on pages 146-7 of this Report.

succumbed to a malignant type of this fearful disease. All ten of them had true typhoid fever. Three of them died, the mother, one girl 18, and another girl of 7. For two months every member of the family was sick abed.*

27. Not always.
28. Some have, at times, from lack of use.
29. No.
30. Very clear of organic material; clear and not very hard or soft—medium.
- 31, 32. Nothing.
33. Rainfall has less to do with the supply here than elsewhere.
34. None.
35. I might give details of other cases affected by impure water; the above is the most marked under my observation.
36. Cannot.

Respectfully,

Clinton, Mich., Nov. 13, 1876.

A. W. ALVORD.

REPLIES BY E. N. DUNDASS, M. D., OF LUDINGTON, MICH.

State Board of Health:

GENTLEMEN:—I will proceed to answer your questions as follows: †

1. Reside in a small city.
2. Well-water.
3. No relation.
- 4, 5. No.
6. Eighteen feet below surface.
7. Galvanized iron.
8. No.
9. Filter pumps.
- 10, 11. No.
12. No way of estimating.
- 13, 14. No.
- 15, 16, 17. ———.
18. To the fullest extent.
19. Principally sand; occasionally gravel.
20. From 18 to 40 feet.
- 21, 22, 23. ———.
24. In parts of the city that are crowded, 30 to 40 feet.
25. No cesspools.
26. ———.
27. No chance for contamination.
28. Water inodorous and tasteless.
29. No analysis.
30. Water clear and soft.
31. Water offensive to taste and smell.
32. No lead pipes used. Galvanized iron, after long use, contaminates the water with iron.
33. Not subject to any effect by freshets or drought, in this vicinity.
- 34, 35. No.
36. Never observed any influence on diseases by the use of water.

By preserving this circular, something of importance may come up in the future that may afford more light on the subject under consideration.

Your obt servant,

Ludington, Mich., Nov. 15, 1876.

E. N. DUNDASS.

REPLIES BY C. V. BEEBE, M. D., OF OVID, MICH.

DEAR SIR:—In compliance with your request, I herewith enclose answers to the questions regarding water-supply. †

1. Village.
2. Wells, mostly; two or three springs.
18. Wholly.

* [For further account of this family and its unsanitary surroundings, see in index, "Palmer, D. W., Clerk of Bridgewater township, Washtenaw Co.," for reference to page in first part of this Vol.]

† The figures beginning paragraphs refer to questions in Circular 7, printed on pages 146-7 of this Report.

19. Coarse gravel. Sand and gravel.
 20. Fourteen feet.
 21. Sand and gravel, and coarse gravel.
 22. I think towards the east.
 23. Coarse gravel.
 24. Two to three rods.
 25. Ten to fifteen feet.
 26. Some (a few) are particular to carry slops and the like two or three rods from the well.
 27. More or less danger.
 28. Yes, during summer; rats and frogs the cause.
 29. The water from two or three wells upon the farms of H. B. and Wallace Gleason was sent to Lansing in the fore part of the season for analysis. Did not learn the result. Doubtless you know already. Several of the two families were taken suddenly ill, and the cause was attributed to the well-water. Thought to look the matter up soon. These parties live about $2\frac{1}{2}$ or 3 miles north of Ovid.
 30. Water clear; does not contain organic matter in large quantities. Our wells are all curbed, as the gravel is so loose that the wells will cave before they can be stoned.
 31. Nothing worth mentioning.
 32. Nothing.
 33. No difference here.
 34. Some families live within 10 or 15 rods of the cemetery.
 35. Nothing, except cases already referred to.
 36. Have not observed any.
- You will find these answers approximately correct. Did not have time to canvass the whole town.

Very respectfully yours,

Ovid, Mich., Nov. 14, 1876.

C. V. BEEBE, M. D.

REPLIES BY W. WORSFOLD, M. D., OF AUGUSTA, MICH.

Secretary State Board of Health:

DEAR SIR:—In answer to circular 7, relative to water-supply, I would say that the water supply of this village is drawn exclusively from wells; that the character of the water is in every way good.

Answers to interrogations of circular: *

1. In a village.
2. From wells, exclusively.
3. None.
13. No artesian well here.
14. No instance of cistern-water being used.
19. Soil is sandy and gravelly.
20. Usual depth of wells, 20 to 25 feet; some, in higher part of the village, run as deep as from 35 to 48 feet; on the flat, some are, on the contrary, only 15 or 16 feet.
21. The strata are composed of sand and gravel.
22. Strata dip in a direction south and south-east, toward the Kalamazoo river.
23. The stratum underlying the well-bottom is of gravel.
24. Distance of privies from wells, from 30 to 70 feet; do not think there is any well supplying house more than 70 feet from privy, nor less than 30 feet.
27. There are one or two instances only where contamination would appear likely to occur from the relative positions of out-houses and wells. These I have noted for future observation.
29. No analysis of water has been made.
30. The water is good, clear, and I think, from its action upon iron tubing, contains some free carbonic acid.

Yours very respectfully,

Augusta, Mich., Nov. 20, 1876.

W. WORSFOLD.

* The figures beginning paragraphs refer to questions in Circular 7, printed on pages 146-7 of this Report.

REPLIES OF A. P. DRAKE, M. D., OF HASTINGS, MICH.

Secretary of State Board of Health :

DEAR SIR:—Below you will find answers made to the best of my information, to circular 7:*

1. City.
2. Wells.
- 3, 4. Surface drainage, but good.
- 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17. No.
18. Universally.
19. Clay and sandy loam.
20. From 15 to 50 feet, according to height above river-bed.
21. Clay and sand.
22. Towards the river, generally north-east.
23. Fine and coarse gravel.
24. From 30 to 100 feet.
25. Can't say.
- 26, 27, 28, 29. No.
30. Clear. No. Hard.
- 31, 32, 33. Nothing deleterious.
34. Thirty rods or more.
35. At the jail, a few years ago, there was evident drainage from the cesspool to the well, and several cases of sickness in the family were attributed to using the water from the well. A new well was dug at a considerable distance away from the old well, the cesspool was filled up, and a new one formed farther away, since which time there has been no unusual sickness at that place. The soil was of light sand.
36. No.

Respectfully yours,

Hastings, Mich., Dec. 4, 1876.

A. P. DRAKE.

REPLIES BY E. N. PALMER, M. D., OF BROOKLYN, MICH.

Water-supply of the village of Brooklyn and vicinity.*

1. Village.
2. Wells.
3. A close relation to drainage; with but few exceptions, no relation to sewerage.
14. But two or three families use cistern water.
16. Is filtered before use.
17. Brick or stone.
18. Almost entirely.
19. Sandy loam from 8 to 22 feet; then clay, yellow or blue, with thin strata of gravel occasionally.
20. From ten to sixty feet.
21. Sandy or gravelly loam, 8 to 22 feet; then clay with a six-inch stratum of gravel about midway for the next 30 feet; then sand rock.
22. North, north-east.
23. Rock (sandstone).
24. From forty feet to ten rods.
25. From forty feet to ten rods, with one exception known, in which the distance is within 15 feet.
26. Sink within one foot of the outer edge of well, with 16 feet of wooden pipe, with no cavity for conduit; slop soaking into the ground about 3 feet from surface.
27. They are not.
28. Yes; generally after spring freshets.
29. No.
30. The quality is good, except as per answer "28." A majority of the wells are not dug below the clay stratum, consequently they are filled only by surface drainage or leakage; but owing to soaking through *sandy* soil the water in a great measure is purified, although after spring rains the water in most of the wells will be within six feet of the top of the ground. There is probably not much organic matter contained therein. The water is always hard.
- 31, 32. Nothing.
33. The water is purer in dry times.

* The figures beginning paragraphs refer to questions in Circular 7, printed on pages 146-7 of this Report.

34. In the case mentioned in answer "26," two of the family have died of tuberculous disease before the age of 20, and they have more or less sickness in the family most of the time. The family look more like the dwellers of underground rooms in cities than like the robust dwellers in a healthy village.

35. In one family, cerebro-spinal meningitis and diphtheria were caused by drinking water from a well in the barnyard, where the water was nearly of the color of wine. At least the family have been free from all diseases since discontinuing the use of this water (two years and over). Previously to that time sickness was prevalent in the family most of the year.

36. My experience has been that impure water has a depressing or devitalizing effect in all diseases either epidemic or otherwise; that those persons in the habit of drinking impure water are in a condition to take on disease more readily, have the disease with greater intensity, and recover more slowly; and that fatal results more frequently follow.

I wish to say in conclusion that, thinking it my duty to *prevent* as well as to treat disease, I have endeavored to educate the families in my charge as much as possible in hygienic measures, and will mention the case of one family who had been afflicted with typhoid fever and diphtheria yearly from the time they moved into the house until three years ago, since which time none of the family has required any medical treatment worth mentioning. From February each year to June or July there would be, and is now, from six inches to three feet of water in the cellar. Their well is about eight feet from a neighbor's cesspool. They now put in the cellar, monthly, 1 lb. of sulphate of iron and $\frac{1}{2}$ lb. of chlorinated lime; in the well, monthly, one ounce of sulphate of iron.*

I find upon inquiry that families living there before were generally sickly, typhoid fever being quite frequent.

All of which is respectfully submitted.

Brooklyn, Jackson Co., Mich.

E. N. PALMER, M. D.

REPLIES BY R. F. STRATTON, M. D., OF ST. JOSEPH, MICH.

Secretary State Board of Health:

DEAR SIR:—Please find below my statement in regard to the water-supply of this town.†

1. Village.
2. Wells and cisterns.
3. Wells and cisterns contaminated by the sewage and drainage of the town.
4. Drains to sinks and cellars passing near wells.
14. Largely.
- 15, 16. No.
17. Brick and cement.
18. Altogether for cooking and drinking.
19. Sandy loam.
20. Fifteen feet.
21. First, sand; then clay.
22. North.
23. Clay. Some six deep wells (80 feet) go to the level of the lake, into beach sand.
24. Fifty-five to seventy-five feet.
25. Twenty to forty feet.
26. Privy 15 feet from well; privy, a vault, and never emptied; many such cases.
27. No.
28. Yes. In the Spring, by high water and general surface drainage. In the Summer the water is warm from the little depth.
29. No.
30. Except these deep wells, which give excellent water, they all contain organic matter (in my opinion) dangerous in form and amount.
33. Answered in "28."
- 35, 36. The water is generally believed to contribute largely to the bilious and malarial fevers so prevalent in this locality.

Respectfully yours, etc.,

St. Joseph, Mich., Dec. 16, 1876.

R. F. STRATTON, M. D.

* [Would it not be better to drain or fill the cellar, and also secure pure water, or move from such an unhealthy location? H. B. B., *Sec'y.*]

† The figures beginning paragraphs refer to questions in Circular 7, printed on pages 146-7 of this Report.

REPLIES BY W. F. MASON,* HEALTH OFFICER OF BERRIEN SPRINGS, MICH.

Secretary State Board of Health:

SIR:—I have the honor to give answers to questions in circular No. 7, from your office: †

1. Incorporated village of Berrien Springs, Berrien Co., Michigan.
2. Wells.
14. Not at all for drinking purposes.
18. Wholly.
19. Generally black loam.
20. Twenty feet, average.
21. Black loam, two to three feet; clay hardpan about two feet; gravel ten to eighteen feet; yellow clay two to three feet; blue clay four to eight feet; afterwards, sand.
22. Easterly, toward St. Joseph river.
24. None less than 40 feet; generally further.
25. No cesspools.
27. No danger.
28. No.
30. Clear and hard—otherwise pure.
34. Cemetery $1\frac{1}{2}$ miles distant.

REMARKS.—Have no trouble with reference to supply or quality of water, and in my opinion, no diseases result from its use in this village.

Very respectfully yours,
W. F. MASON, M. D.

Berrien Springs, Mich., Nov. 20, 1876.

REPLIES BY GEO. J. NORTHIROP, M. D., OF MARQUETTE.

To the Secretary of the State Board of Health:

DEAR SIR:—In reply to Circular No. 7, relating to our water-supply, I have to say:†

1. City.
2. Lake Superior.
3. No complete system of sewerage, but what sewage we have and all the surface water enter the lake.
6. Supposed to be taken from deep water in the open lake.
7. Wooden.
8. No reservoirs.
9. No.
11. Said to be 200,000 gallons.
12. Don't know.
13. None.
14. I think some.
- 15, 16. I think not.
17. I suppose, of wood.
18. About one-third.
19. Sand everywhere.
20. Varies from 40 to 90 feet.
21. Sand.
22. I think none.
23. Sand and gravel.
- 24, 25, 26. I cannot tell.
27. I think not.
28. Lake water, good. I don't know as to the cisterns or wells.
29. The analysis made in July, 1874 is the latest—that approximate only: “mechanical and floating matter, 1-14 gr. to a gall.; matter in solution, 4.28 grs. to a gall.”
- 31, 32. The water pipes are of iron. The wells are curbed with wood.
- 33, 34, 35, 36. None known.

Marquette, Mich., Jan. 8, 1877,

Yours respectfully,

GEO. J. NORTHIROP.

* Not a regular correspondent, but kindly contributes these replies.

† The figures beginning paragraphs refer to questions in Circular 7, printed on pages 146-7 of this Report.

REPLIES BY C. L. CHAMBERLIN, M. D., OF CANONSBURG, MICH.

Secretary of the State Board of Health:

SIR:—

1. I am located in the village of Cannonsburg, Mich. *
2. Entirely from wells and natural springs.
3. Not any.
11. Don't know.
12. Don't know. It is free, and we use it as much as we please.
14. Only for washing and cleansing purposes.
- 15, 16. No.
17. A few are made of brick or stones and plastered with water-lime, but generally the cement is put on the earth.
18. Almost exclusively, except for washing.
19. Generally a gravelly loam with clay subsoil.
20. From 16 to 25 feet.
21. Usually sand or gravel.
22. Can't say.
23. Usually gravel.
24. Seventy-five feet.
27. Yes.
- 28, 29. No.
30. Very clear; hard; think it does not contain organic matter in dangerous quantities.
- 31, 32. Nothing.
33. Our land is so rolling that freshets do not affect our wells.
34. Graveyard 80 rods from nearest well.

Respectfully yours,

Cannonsburg, Mich., Jan. 26, 1877.

C. L. CHAMBERLIN, M. D.

REPLIES BY W. B. SOUTHARD, M. D., OF KALAMAZOO, MICH.

DEAR SIR:—Reply to Circular No. 7.*

1. Village of Kalamazoo.
2. From wells, principally. About three-tenths of the families use water supplied by the Holly water-works, taken from a well having cement wall and water in the well 25 feet deep. Water said to be very pure, having been analyzed (I think by Prof. Kedzie). The larger part of the wells are bricked up and from 18 to 22 feet in depth.
3. No system of sewerage. Within the last five years much has been done in surface-drainage by grading the streets.
14. Not at all.
18. There are a number of springs along the border of the marsh skirting the south and eastern parts of the village.
19. Alluvium surface with hardpan subsoil and gravel beneath.
20. 18 to 22 feet.
- 24, 25. Wells are often found within fifteen to twenty feet of privies, but generally are from 30 to 40 feet distant.
26. Would refer to report of cases heretofore reported to State Board of Health.†
27. I believe that many of our wells are affected more or less by contamination from vaults.
28. Water supplied by water-works is excellent. In some instances, well-water does not seem good.
30. Clear and hard.
31. In one instance, where I had two cases of typhoid fever, I was looking after the water and found a spring about six feet below the surface, curbed, with platform and pump. Upon removing the platform, I found a large quantity of decaying fungi on the curbing. Attributed the illness to the impure water.
32. Iron pipes only are used by water-works, and have no appreciable effect upon the water.

* The figures beginning paragraphs refer to questions in Circular 7, printed on pages 146-7 of this Report.

† [For cases referred to, see the Third Annual Report of this Board, pages 68-69; also, in index of this volume, "Replies to Circular 15, Relative to Prevailing Diseases of 1876, by W. B. Southard, M. D., Kalamazoo." H. B. B., Sec'y.]

33. Does not affect the wells directly, only as the soil becomes saturated or dry; have observed no particular difference.

35. Would refer to cases heretofore reported.*

Very respectfully,

Kalamazoo, Mich., Feb. 5, 1877.

W. B. SOUTHARD, M. D.

REPLIES BY D. W. C. BURCH, M. D., OF ROCKFORD, MICH.

Secretary State Board of Health:

DEAR SIR:—Answers to questions in Circular 7:†

1. Village.
2. Springs and wells (principally drive-wells).
3. None.
14. Only occasionally.
- 15, 16. No.
17. Water-lime.
18. Almost entirely.
19. Gravel, quicksand, and clay; mostly gravel.
20. Twenty feet, average.
21. Sand, clay, and loam.
23. Clay, I think.
24. Twenty feet.
25. Ten feet.
27. Yes; wells in many instances are liable to contamination from privies.
30. Generally clear.
34. None; we are all right there.
35. None, except what has been reported in a communication relative to diphtheria.‡
36. Same as 35.

We have no sewerage; our village is situated on a gentle slope of ground on Rogue River, giving us a splendid surface-drainage, and a gravel soil for under-drainage.

Respectfully yours,

Rockford, Mich., Feb. 17, 1877.

D. W. C. BURCH.

REPLIES BY A. W. NICHOLSON, M. D., OF OTISVILLE, MICH.

To the Secretary of the Michigan State Board of Health:

I respectfully submit the following replies to Circular 7, water-supply:†

1. Village.
2. Mostly wells.
3. Sustain little relation.
- 4-13. Do not apply.
13. Not at all for domestic purposes.
14. To no extent.
- 15-18. Do not apply.
18. Well-water for all culinary purposes.
19. Loam, resting on a stratum of blue clay.
20. From 15 to 80 feet.
21. Sand or loam, blue clay, gravel.
22. West.
23. Blue clay to the depth of about 77 feet,—below that, gravel.
24. One hundred to two hundred feet.
25. No cesspools that require consideration.
26. No cases.
27. Danger slight at present.
28. No cases observed.
29. None lately made.

* [For cases referred to, see the Third Annual Report of this Board, pages 68-69; also, in index of this volume, "Replies to Circular 15, Relative to Prevailing Diseases of 1876, by W. B. Southard, M. D., Kalamazoo." H. B. B., *Sec'y.*]

† The figures beginning paragraphs refer to questions in Circular 7, printed on pages 146-7 of this Report.

‡ [For cases referred to, see in index of this volume, "Burch, M. D., D. W. C., letter relative to diphtheria." H. B. B., *Sec'y.*]

30. Water hard and generally clear. Alkalinity in some cases quite marked.
- 31, 32. No observations.
33. Well-water sometimes affected by surface water after heavy rain falls.
34. No close relation.
35. No cases.
36. The above replies refer to this village and to the well-settled districts adjoining. In the sparsely settled portions, surface water is principally used, which circumstance often seems to increase malarial and other disorders in said districts.

Yours, very respectfully,

Otisville, Mich., April 20, 1877.

A. W. NICHOLSON, M. D.

REPLIES BY E. A. CHAPMAN, M. D., OF WALLED LAKE, MICH.

Secretary of State Board of Health:

DEAR SIR:—Enclosed please find answers to such questions of Circular No. 7 as this locality will furnish data for.*

1. I am located at Walled Lake, a country village situated between the townships of Novi and Commerce, Oakland county.
2. Mostly from wells and cisterns.
3. Comparatively no relation.
- 4, 5, 6, 7, 8, 9, 10, 11, 12. Not applicable here.
13. No artesian well here.
14. Only for washing.
- 15, 16. No.
17. Water-lime cement, on walls of stone or brick.
18. Exclusively, for drinking and culinary purposes.
19. Sand and clay.
20. From 15 to 60 feet; average about 30.
21. Clay (yellow and blue), sand, and gravel.
22. Mostly south and south-east.
23. Principally clay, gravel occasionally.
24. 20 to 75 feet.
25. Cesspools not common here.
26. Have observed none.
27. The danger, if any, is very slight.
28. It has not to my knowledge, except from rats or other animals having fallen into it.
29. No.
30. It is clear; does not contain organic impurities in dangerous amount; is hard.
- 31, 32. Nothing.
33. Have not observed that either of the conditions named affected the supply unfavorably.
34. Cemetery is located on a sandy elevation of ground, one-quarter of a mile south-west of Walled Lake village. The ground from it slopes south-east, and drainage is in that direction. There is one well in use, about four rods north of it; but it never has been apparently affected from it.
35. There has been no such case.
36. There has been none.

Respectfully yours,

Walled Lake, Mich., April 30, 1877.

E. A. CHAPMAN.

REPLIES BY E. V. CHASE, M. D., OF ELSIE, MICH.

Secretary State Board of Health:

In reply to the questions asked in Circular 7, concerning water-supply, I would say:*

1. Elsie is a village without a charter.
2. From wells and cisterns.
3. None.
13. There are no artesian wells.
14. For washing, only.
- 15, 16. No.

* The figures beginning paragraphs refer to questions in Circular 7, printed on pages 146-7 of this Report.

17. Water-lime and sand.
18. Well-water is used entirely, for cooking and drinking.
19. Sand and clay.
20. From ten to thirty feet.
21. Sand, first; then a mixture of sand and clay; then a finer grained sand, after which either quicksand or quicksand and gravel, in which the water is found.
22. South from center of ridge to Baker's creek, and north to Curtis's creek.
23. The stratum that underlies the water is composed of blue clay, sand, and small stones.
24. From 50 to 75 feet.
25. About the same distance, but usually much farther.
28. In the fall of 1870, the water in the wells seemed to be loaded with a substance that seemed to cause a great deal of sickness. This Fall an epidemic dysentery broke out among the people, that we attributed to the vitiated water.
29. None.
31. Not particularly.
32. There are no lead pipes used except in cisterns, and from them the water is not used for drinking.
34. The cemetery is in rather too close proximity to the village, but I think it does not affect the wells surrounding it.
35. None.
36. In the Fall of 1870, during the epidemic, we were obliged to order the patients not to use the water until it had been somewhat purified by boiling.

Yours, very truly,

E. V. CHASE.

Elsie, Mich., July 29, 1877.

REPLIES BY D. C. HOLLEY, M. D., OF VERNON, MICH.

Answers to Circular relative to water-supply of village of Vernon and vicinity, Shiawassee county, Mich. *

1. A small village of 600 or 700 inhabitants.
2. Exclusively from wells, by far the largest proportion being what are called drive-wells. Among the farmers, many use water from open or stoned up wells.
3. So far as I have been able to observe, the drive-wells are quite free from any possible contamination from slop, sewerage, privies, or cesspools. But with open wells it is strikingly otherwise. One family in particular, for many years used water for household and drinking purposes from an open well. They suffered, while so doing, from typhoid fever, severe chronic diarrhea, etc., etc. Afterwards, they substituted a drive-well, and the surviving members are enjoying good health. The well in question was situated close under the eaves of the house and received, as a matter of course, the surface washing during rains and melting of snows. Several other farmers' families with similarly situated wells have had a similar experience.

Nothing appertaining to Nos. 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, or 17.

18. Wells, either open or drive, exclusively.

19, 20, 21. The land in this section of Michigan is heavily timbered; the soil is largely alluvial drift; about three feet below this a heavy argillaceous subsoil is found; after passing through 6 to 10 feet of yellow clay we enter what in common parlance is known as blue clay, usually of about the same depth, 6 to 10 feet, so that we might say the usual depth of wells ranges from 20 to 30 feet.

22. The general dip of strata is to the north-east.

23. After passing the blue clay, at a depth varying from 18 to 30 feet, we enter the water-bearing stratum of coarse gravel, from 2 to 6 feet in thickness, subsequently finding clay formations.

24. From 30 to 50 feet generally; often in much closer proximity.

25. Very often putrid and foul water (slops of the house) are found in the immediate vicinity of open wells, and must necessarily drain, to a greater or less extent, into them.

26. It has been a common observation with me, especially in rural districts, to note the connection between impure well-water and the prevalence of typhoid fever, typho-malarial fever, and fevers of a low grade generally. More especially was this the case when the country was newer.

- 27, 28, 29, 30, 31, 32. Nothing.

33. Nothing of note.

34, 35. There are two graveyards within the environs of this village. The primitive graveyard, now disused and removed, was originally the only cemetery of this part

* The figures beginning paragraphs refer to questions in Circular 7, printed on pages 146-7 of this Report.

of the township and was the only place of interment for a large extent of country; but it was discontinued in the spring of 1861, and all the bodies and remains that could be found were removed. This plat of ground occupied about one acre right in the centre of the village as it now stands. The Congregational church has since been built on part of the plat, the balance is unoccupied. But the village commenced its existence with the coming through of the D. & M. Railway, in the year 1856, and soon a number of dwellings were erected and inhabited on all sides of this plat of ground, this plat of ground being as high, or perhaps a little higher than any other part of the village. Immediately upon the removal of the graveyard, Deacon J. Wilkinson purchased a lot at the north-east corner adjoining this ground and proceeded to erect a dwelling and barn. The barn was built first, in which the family lived first whilst the house was being erected; at the same time an open well was dug within 30 feet of the old graveyard. This well supplied the family with water for culinary and drinking purposes. Within three months Mrs. W., aged about 60 years, sickened and died with typhoid fever. There may be no connection in this case between the well-water and the fever; but the lady had lived for 25 years on a farm within three-fourths of a mile of the village, had suffered, as usual with early pioneers, from our common malarial fevers endemic to the locality. Again, Mrs. Pinney, living on the west side of the graveyard plat, used water from an open well dug about 50 feet from the plat, sickened and died with typhoid fever in the Autumn of 1865. Subsequently, in the Autumn of 1870, a family from the country moved into the house on the same lot where Mrs. Wilkinson died; the lady of the household soon sickened and suffered for a long time with some form of low fever, probably typhoid; but she was not under my care, and I could not learn the facts in the case. The woman recovered and the family moved out. A family of seven persons occupied the house subsequently. The family did not use the water from this well, but obtained their water-supply from neighboring wells. During the succeeding Winter a child of two years of age sickened and died of pneumonia; in the Autumn succeeding, the mother and a little boy of 12 years, two little girls, aged respectively 6 and 8 years, all had typhoid fever; the woman and little boy, both, were grave cases; all recovered. The well, though disused, was situated under the piazza on the south-west part of the dwelling, within 20 feet of old graveyard; it was not filled up, but covered up with loose boards, and was evidently a source of blood poisoning in these cases. Again the occupants of this house were changed; the new comers were a man, his wife, two children, and two old people, aged respectively about 60 and 65. The first Summer, 1874, the child, aged 2 years, sickened with cholera infantum, and after a long illness died. The following Winter, the grandmother had a long fit of sickness, in irregular hands, but ultimately recovered. So much for the medical history of this dwelling. In August, 1875, Mrs. Handy, living in a house close adjoining this old cemetery, near the north-west corner, living within 30 feet, and using water from a drive-well situated equally in proximity, sickened and died with typhoid fever, her sickness lasting about three weeks. I should have mentioned before, that in the Autumn of 1874, a man by the name of Cummings, living about twenty rods south of the plat, and using water from shallow drive-wells, sickened and died with typhoid fever; the house where he lived was situated on ground some ten or twelve feet below the ridge where the old graveyard had formerly been.

The new cemetery stands on the highest ground adjoining the village on the north-west. About 30 rods south of the cemetery and parallel with it, and perhaps 10 or 15 rods below, is a little run through which flows quite a stream of water in times of freshets. Running south from the cemetery are two streets upon which, between the run and the grounds, are about one dozen dwellings. In the Autumn of 1875 there occurred four cases of typhoid fever, three of which were of great gravity, one terminating fatally. The water used by these families was obtained from drive-wells adjoining the houses. The man whose case terminated fatally complained that the water tasted badly; to use his own words, "that it must be drainings of some *cat-hole*;" yet it was from a drive-well situated about twenty rods from the cemetery and perhaps ten feet below it.

The other three cases used water from the same well, but all recovered. These detailed cases of typhoid fever are nearly all the cases that have ever occurred in the village, from its commencement as a town.

I would not be understood as positively stating the connection as cause and effect between the water used and the fever, but to my own mind the evidence is strong in that direction. I have given the facts in the premises and leave others to form their own conclusions.

Yours truly,

Vernon, Shiawassee Co., Mich.

D. C. HOLLEY, M. D.

REPLIES BY ROBERT STEPHENSON, M. D., OF ADRIAN, MICH.

Secretary of the Michigan State Board of Health :

Response to Circular 7, water-supply : *

1. Adrian city, 230 feet above lake Erie.
2. Wells.
13. Have no artesian wells.
14. Used by a few.
- 15, 16. Yes.
17. Stone or brick, plastered with water-lime.
18. Well-water, almost entirely.
19. Sandy loam.
20. About thirty feet.
21. Sandy loam, clay, fine white sand, coarse gravel closely packed so that no water penetrates through; again, fine white sand, through which the water flows.
22. Towards the south-east.
24. Thirty to fifty feet.
25. Thirty to forty feet.
27. Most of them are.
28. No.
29. I know of no analysis being made of the usual drinking-water. The following is an analysis of water from a so-called mineral spring:

Specific Gravity, 60° Farenheit, 1.0023.

Grains per Gal.		Grains per Gal.	
Sulphate of Potassa.....	.35	Bicarbonate of Magnesia.....	1.36
Sulphate of Soda.....	4.20	Bicarbonate of Iron.....	1.73
Chloride of Sodium.....	1.63	Silica, Alumina.....	2.50
Chloride of Calcium.....	.45	Organic matter.....	2.00
Phosphate of Soda.....	.97	Loss.....	.53
Bicarbonate of Lime.....	12.60		
Total constituents, per gallon:			
Bicarbonates.....	15.69	Chlorides.....	2.10
Sulphates.....	4.55		
Free Carbonic Acid, 4 cubic inches.			

The above analysis was made by Dr. Samuel P. Duffield.

30. Hard and clear.
- 31, 32. Nothing.
33. Nothing particular.

Adrian, Mich., Aug., 1877.

Yours respectfully,

ROBT. STEPHENSON, M. D.

REPLIES BY C. W. BACKUS, M. D., OF THREE RIVERS, MICH.

Secretary State Board of Health :

Sir:—Enclosed find replies to questions on water-supply:*

1. Village, incorporated.
2. Wells.
3. Surface drainage.
18. Well-water altogether.
19. Sandy soil and sandy loam.
20. Twenty to twenty-eight feet.
21. Sand and gravel.
23. Sand or coarser gravel.
24. Five to six rods; in many places, eight rods.
25. One to three rods.
27. Many wells are located too close to cesspools; in my opinion the water will become contaminated in this kind of soil.
28. None.
29. No. Never any to my knowledge.
30. Water very good; clear at all times, and very hard. Do not think it contains

* The figures beginning paragraphs refer to questions in Circular 7, printed on pages 146-7 of this Report.

any organic matter unless from location, and surface water or cesspools oozing into the wells.

31. Have found cases of malarial or bilious remittent fever, accompanied with gastric and intestinal disturbance of an epidemic form, sometimes affecting the whole family. Cause: decomposition of wood-curbings and filth in the well; also, throwing slops and stagnant water near the well, etc., the rain washing it into the well.

32. Nothing.

33. Have the most sickness in this vicinity during the dry, hot months. Though the water looks clear and good and cold, wells are not so full at that season.

34. None; cemetery situated quite a distance from any houses.

35. Three cases of severe remittent fever in a family whose well was but 12 feet deep, on prairie soil; well located at a low point, and stagnant water standing close up around the platform of well; cattle and horses drinking from trough close to well, depositing, whilst there, offal in the stagnant water. The peculiarity in these cases was intestinal and gastric irritation; they were long in recovering health; one died. Six cases similar to the above, from rain washing the slops into the well and other surface water running into it; when cleaned, the well contained about two feet of dirt and filth; water tasted and smelled bad.

36. Not observed any. Our village is located on a peninsula, sand soil, formed by the junction of the three rivers, which streams are spanned by a dam for water-power; village thirty feet above low water-mark. Our well-water is found in gravel soil; no hardpan at all. By some it is supposed the source of the water is the streams, and that it oozes through the sand and gravel.

Respectfully submitted.

Three Rivers, Mich., Aug. 20, 1877.

C. W. BACKUS.

REPLIES BY A. M. OLDFIELD, M. D., OF LEXINGTON, MICH.

1. * Village.
2. Wells and springs.
3. None whatever.
18. Almost universally.
19. Clay subsoil.
20. Average, fifteen feet.
21. Clay.
22. Towards south-east.
29. ———.
30. Clear and hard. My opinion is that it does not contain organic matter incompatible with health.

Lexington, Mich., Aug. 24, 1877.

A. M. OLDFIELD, M. D.

REPLIES BY NELSON H. CLAFLIN, M. D., OF EAST SAGINAW, MICH.

Secretary of the State Board of Health:

SIR:—In answer to the Circular relative to water-supply, I respond as follows:*

1. In the city of East Saginaw.
2. River (Tittabawassee) and wells.
3. That from river is taken above the city, and is not influenced by any other city, etc.
4. There is not a close relation.
5. Rapidity, four miles per hour. It is constant; direction, north.
6. 1,400 feet to Holly water-works, in wood pipe three feet diameter, then forced through iron pipes.
8. Not at all.
9. There is a filter, but most of the water is pumped directly from river.
10. ———.
11. 1,000,000 gallons; not so much in the Winter.
12. Comparatively few use Holly water. There are about 17,000 inhabitants; average about 58 gallons.
13. Not at all.
14. Very few use it; perhaps one in two hundred of the inhabitants.
15. No.

* The figures beginning paragraphs refer to questions in Circular 7, printed on pages 146-7 of this Report.

16. Yes.
17. Wood.
18. Well-water used by four-fifths of the inhabitants. No springs.
19. Clay.
20. Eight to twenty-four feet.
21. Clay, only.
22. —.
23. Clay. Wells are simply a hole in the clay for water to filter into.
24. Thirty to eighty feet.
25. There are no cesspools; slops from kitchens, etc., are thrown on surface of ground 15 to 80 feet from wells.
26. Know of none.
27. Water-works are; cisterns generally are; wells *seldom* are; a *few* are built with water-lime and brick, and built above surface so as to exclude surface water (very few).
28. Wells *usually* are, from surface water and drainage from surface.
29. No.
30. Seven-eighths of it, clear; one-eighth, turbid; one-twentieth, probably does contain organic matter in small quantities. Hard.
31. Only that particles of the rotten wood are separated and mixed with the water drawn.
32. Nothing.
33. Rain gives surface water in all wells here. Drought requires the water to filter in through the clay, and the water is better when we have but little rain.
34. None.
35. Frequent cases of diarrhoea occur in persons not accustomed to using the water here.
36. And it often seems to increase the tendency to malarial fevers.

Yours truly,

East Saginaw, Mich., Aug. 7, 1877.

NELSON H. CLAFLIN, M. D.

REPLIES BY E. S. SNOW, M. D., OF DEARBORN, MICH.

Secretary of the State Board of Health:

SIR:—I answer Circular No. 7, as numbered.*

1. In small village.
2. Wells and cisterns.
- 3, 4. It has no such relation.
- 5, 6, 7, 8, 9. It is not taken from a stream.
10. —.
- 11, 12. Cannot tell.
13. Not used.
14. Only for bathing and washing.
15. Sometimes.
16. Seldom.
17. Brick and water-lime.
18. Used entirely for drinking and culinary purposes.
19. Both sand and clay soil.
20. From 10 to 40 feet.
21. Sand and blue clay.
22. North-west.
23. Blue clay.
24. 100 feet.
25. 100 to 500 feet.
26. As a general thing, it is so.
27. Generally, but with some exceptions.
28. It is quite often the case in water from wells. Most generally in the latter part of Summer; cannot tell why.
29. There has not.
30. It is clear when first taken from the well. I believe it sometimes does. Hard.
31. Wooden pipes sometimes give taste to the water.
32. Lead pipes not used for drinking and cooking water.
33. It usually makes very little or no difference.

* The figures beginning paragraphs refer to questions in Circular 7, printed on pages 146-7 of this Report.

34. Two families living across the street from an old graveyard, get their water for drinking and cooking from wells in rear of their houses; but no sickness has arisen from it.

35. I know of no such cases.

36. I have observed no case of epidemic disease or sickness where impurity of water used has had any apparent influence in its production.

Respectfully,

Dearborn, Mich.

E. S. SNOW.

REPLIES BY W. G. ELLIOTT, M. D., OF PONTIAC, MICH.

Answers to Circular 7, water-supply :*

1. City.
2. Wells.
3. Surface drainage into the river.
13. None.
14. None except for washing.
17. Cemented on brick, stone, or clay.
18. Wholly.
19. Variable,—clay, sand, gravel.
20. Fifteen to sixty feet.
21. Sand, clay, gravel, and blue clay five to twenty feet.
22. Not positive; from limited observation, should say south-west.
23. Blue clay, terminating in coarse gravel.
24. Forty to fifty feet; many, much further.
25. But few 50 to 100 feet.
26. Do not know of any.
27. None.
30. Clear, moderately hard, and does not contain any organic matter of any amount.
- 31, 32. None.
33. None; rainfalls or freshets slightly affect the water-supply.

I have omitted to answer some questions; they do not apply to this locality.

Yours respectfully,

Pontiac, Mich., Oct. 20, 1877.

W. G. ELLIOTT.

REPLIES BY M. NORTHUP, M. D., OF PORT HURON, MICH.

Replies to Circular relative to water-supply :*

1. City of Port Huron.
2. From St. Clair River, half a mile from Lake Huron.
3. It is below the village of Fort Gratiot and the Grand Trunk R. R. crossing.
4. Fæcal excretions from boats, cars, and privies.
5. Nine miles an hour, south-east; current steady.
6. No distance.
7. Cast iron pipes.
8. No reservoirs.
9. No process of any kind.
- 10, 11. ———.
12. Forty-five gallons.
13. None.
14. For washing, only.
- 15, 16. ———.
17. Wood.
18. One-fourth of the inhabitants.
19. Clay, overlaid with sand.
20. Ten feet.
21. Sand, and into the clay.
22. Unknown.
23. Clay, interspersed with limestone.
24. Forty feet.
25. Fifteen feet.
26. Have seen the privies within 15 feet, and cesspools within 5 feet.
27. No.

* The figures beginning paragraphs refer to questions in Circular 7, printed on pages 146-7 of this Report.

28. From wells; causes not ascertained.
 29. None.
 30. Think the water is good from the wells, but it is turbid after, and during a gale on Lake Huron. It is a little hard. From the wells it is generally bad.
 31. Nothing.
 32. There is much lead pipe (service pipes) in use. Observe no bad effects.
 33. No effect here.
 34. One graveyard, on high ground, containing 2,500 graves, is entirely surrounded by inhabitants who mostly get their water from wells. In some of these wells the water is stinking, but I have never traced any disease directly to this water.
 35. The sewers of this city empty into Black River, a tributary to the St. Clair. Below this city, where people have used the mixed waters, they have had typhoid fever this Summer, a disease almost unknown in this city.
 36. Have observed none.

Yours, etc.,

Port Huron, Mich., Oct. 28, 1877.

M. NORTHUP, M. D.

REPLIES BY WM. P. MAIDEN, M. D., OF ALPENA, MICH.

Secretary State Board of Health:

DEAR DOCTOR:—I regret that I have not been able to send you the subjoined report on "Water-Supply" sooner. I have delayed in hope of making a thorough report, but find that impossible at present. I shall report results of investigations on this subject.*

1. City of Alpena.
 2. Cisterns and surface wells.
 3. No sewers. Very inadequate surface drains.
 13. Have four artesian wells, including the so-called mineral well. Only one supplies water fit to drink. One of the wells, down about 30 feet, supplies water black as ink.
 14. To a very large extent. All the best families use it.
 15. No.
 16. Yes, I think, in most every case.
 17. Mostly of pine. Some few of stone and water-lime.
 18. Surface well-water is used almost entirely by the poorer classes.
 19. Sand.
 20. From three to six feet, seldom deeper.
 21. I know of no well in the city beneath the sand, except artesian.
 24. Average, 40 feet.
 27. The surface wells are all more or less contaminated with surface drainage.
 28. The well-water is invariably offensive in color, odor, and taste.
 29. Only of the mineral-spring water.
- The following is the analysis by Prof. Duffield:
 Temperature, 52°. Specific gravity, 1.012.

	Per Gallon.
Bicarbonate of Soda.....	15.736
“ Lime	55.136
“ Magnesia	62.920
“ Iron	1.840
Sulphate of Lime.....	30.056
Silica and Aluminum.....	3.088
Chloride of Sodium.....	68.256
Organic matter and Loss.....	.928—237.960

Total mineral constituents, 237.032 grains. Sulphuretted Hydrogen gas, 3.91 cubic inches. Carbonic Acid gas, a trace.

30. Hard; contains organic matter in various proportions.
 34. None; graveyards remote.
 36. Have kept no record of cases that could be clearly attributed to this cause. Will report future observations.

Very respectfully,

Alpena, Mich., Nov. 5, 1877.

WM. P. MAIDEN, M. D.

* The figures beginning paragraphs refer to questions in Circular 7, printed on pages 146-7 of this Report.

REPLIES BY O. B. CAMPBELL, M. D., OF OVID, MICH.

Secretary of State Board of Health:

DEAR DOCTOR:—I have the honor herewith to transmit my replies to Circular 7.*

1. Village of Ovid. Population, 1500.
2. From wells.
3. Drainage exclusively surface. The ground from the northern and southern portions of the village descends towards the central part, and during heavy rains the surface water collects in many of the cellars. But so far as I can learn, the well-water is clear and does not contain organic matter in any considerable amount, which may be accounted for from the fact that the water is thoroughly filtered in the soil.
- 4 to 17 inclusive. Excluded.
18. Well-water is used almost exclusively.
19. Soil is sand and gravel.
20. From 10 to 20 feet.
21. Sand and gravel.
23. Gravel.
- 24, 25. Anywhere, 20 to 100 feet.
26. I know of none.
27. The majority of the wells are not stoned, owing to a scarcity of the article here, but are curbed with wood and have no protection from contamination of surface water, except that afforded by the soil as a filter.
28. So far as my observations have gone, I do not know of any.
29. No.
30. Well-water clear, highly charged with salts of lime, and contains a limited amount of organic matter.
31. No observations.
32. Nothing.
33. My limited acquaintance and stay here have allowed no observations on this point.
34. Quite distinct, so far as I know.
35. Do not know of any.
36. No observations.

Very respectfully,

Ovid, Clinton Co., Mich., Dec. 4, 1877.

O. B. CAMPBELL, M. D.

* The figures beginning paragraphs refer to questions in Circular 7, printed on pages 146-7 of this Report.

RELATIVE TO THE

DISEASES IN MICHIGAN DURING THE YEAR 1876;

INCLUDING A SUMMARY FOR THE STATE, AND THE REPLIES OF

CORRESPONDENTS OF THE STATE BOARD OF HEALTH,

To Circular No. 13, Issued by the Board;

ALSO REPLIES, BY TWO CORRESPONDENTS, TO THE CIRCULAR RELATIVE TO
DISEASES DURING THE YEAR 1875.

Compiled and arranged for publication by the Secretary of the Board.

DISEASES IN MICHIGAN DURING 1876.

In the last Report of this Board, was commenced a systematic record of facts concerning the prevalence or absence of diseases in different parts of the State, including also statements relative to the diseases of animals and of food-crops used by men and animals. This was done with a view to comparisons with records of meteorological and other conditions, and with statistics of deaths, for the same time, in order the better to learn the causes which produce an increase or a decrease in the death-rate or in the sickness from each of the many diseases which afflict mankind.

The record in the last Report was for the year 1875, and this is a continuation of the study, being for the year 1876,—the calendar year previous to the fiscal year ending September 30, for which this volume is a Report.

The statements of facts on this subject were collected by means of a Circular,—printed immediately following this summary,—which was sent to each of the regular correspondents of this Board; and the statements here compiled are contributed by 49 prominent physicians in different parts of the State, 44 localities being represented. This is a larger number than reported for the preceding year, and the most thickly settled parts of the State are well represented.

In the following summary the replies to the questions in the circular are considered in the order in which the questions were placed in the circular. *

1. * In answer to question 1, as to the relative amount of sickness from all causes during the year 1876, one correspondent is "unable to give a correct statement"; 3 report it greater simply; and one, "much greater"; 12 state that it was "about the same as the average"; 32 say that the amount was less than during previous years. Of these, 8 do not state how much less. Of the 8, one says, "a little more than last year, but less than the average of previous years"; one, "about an average for last 5 years; much less in late years than formerly, say 25 years ago"; one, "greater than in 1874 and 1875,—less than in years preceding these". The other 24 say how much less sickness they think there was, the average decrease reported by them being 23 per cent, and the range from 10 per cent to 50 per cent. Of this 24, one says, "about same as in 1874 and in 1875, but less than in previous years by about 20 per cent."

If we allow the 4 who report the sickness greater to offset the 8 who report it simply less, we have, for the 48 correspondents who reply to the question, an average decrease of 12 per cent,—certainly an indication of diminished sickness, though not so marked as that in the last Report, concerning the year 1875.

2. In answer to question 2, two of the 49 correspondents make no statement; 4 report the death-rate greater—one without statement how much greater; 3 state it greater by an average of 26 per cent, and with a range from 10 to 42 per cent; while 24 report it less. Of these, 13 state it less by an average of 16 per cent, and with a range from 10 to 33 per cent. Of the 11 who do not state how much less, one says, "also less than during 1875"; one, "about the

* The figures beginning paragraphs refer to questions in Circular 15, printed immediately after this summary.

same as average for last five years, less than 20 to 25 years ago; per cent of deaths to sickness not diminished"; one, "decidedly less"; one, at Detroit, "173 deaths less than in 1872, 289 less than in 1873, 169 less than in 1874, 104 less than in 1875"; and one, "in 1875, 21 interments; in 1876, 5." If we offset the four who report an increase by the 11 who report a decrease but do not state how great, we have, for the 47 correspondents who reply to the question, an average decrease of 4 per cent in the death-rate in 1876.

3. The substance of the replies to this question is given in tabular form in Exhibit 2 on pages 172-173. The summary for the State is as follows: Of the 49 correspondents who reply to the circular, 6 make no statement in reply to this question; 15 state that no disease or cause of death was more than usually prevalent. Diphtheria is reported more than usually prevalent by 6 correspondents; scarlet fever, by 5; consumption, by 3; old age, by 3; cholera infantum, dysentery, intermittent fever, malarial diseases, membranous croup, remittent fever, typho-malarial fever, whooping-cough, each by 2; accidents, bilious remittents, chronic diseases in very old people, croup, diarrhea of children, erysipelas, fevers, gastric fever, influenza, lung diseases, malarial fevers, mal-nutrition, measles, small-pox, typhoid fever, each by 1.

4. The substance of the replies to this question is given in tabular form in Exhibit 2 on pages 172-173. The Summary for the State is as follows: In answer to this question, 11 correspondents make no statement; 5 others are unable to give any cause of increased prevalence; 15 others state no cause, because, in answer to question 3, they have stated that no disease was more than usually prevalent. Among the causes of increased prevalence of different diseases, unfavorable climatic conditions was mentioned by 6, and unsanitary conditions by 6 correspondents. The prominence given to wet weather followed by hot weather, as a cause of malarial diseases, is worthy of note,—four of the 17 correspondents who name any cause, mention this.

5. The substance of the replies to this question is given in tabular form in Exhibit 2 on pages 172-173. The summary for the State is as follows: To this question, 9 correspondents make no reply; 5 say that no disease or cause of death has been less than usually prevalent. "Malarial diseases" are reported as less than usually prevalent, by 5 correspondents; "typhoid fever", by 5; "malarial fevers", by 4; "pneumonia", by 4; "cholera infantum", by 4; "fevers", by 3; "dysentery", by 2; "lung diseases", by 2; diphtheria, by 2; each of the following diseases, by 1: "scarlet fever"; "all diseases except diphtheria and consumption"; "all diseases except cerebro-spinal meningitis"; "all diseases except influenza, and in the village of Thornville, dysentery and malarious fevers"; "all diseases, particularly zymotic"; "all diseases except consumption"; "all zymotic diseases, except bilious and typho-malarial"; "all zymotics"; "all infectious diseases"; "all epidemic and contagious diseases"; "cerebro-spinal meningitis"; "intestinal diseases"; "measles"; "contagious"; "gastro-intestinal of children"; "eruptive fevers (except small-pox)"; "whooping-cough"; "diseases of the intestinal tract"; "puerperal fever"; "intermittent fever"; "remittent fever"; "diarrhea"; "diseases of brain and nervous system."

6. The substance of the replies to this question is given in tabular form in Exhibit 2 on pages 172-173. To this question, 9 correspondents do not reply; 8 say the cause of the lessened prevalence is unknown; 5, that there was no lessened prevalence, hence no cause could be stated; 17 correspondents mention improved sanitary conditions, and 8, favorable climatic influences, as causes of lessened prevalence of different diseases.

EXHIBIT 1.—*Eleven Geographical Divisions of the State, formed for the purpose of facilitating the study of Causes of Death, with a list of Counties included in each Division.*

1. Upper Peninsular.	2. Northwest- ern.	3. Northern.	4. Northeast- ern.	5. Western.	6. Central.	7. Northern Central.	8. Day and Eastern.	9. Southwest- ern.	10. Southern Central.	11. Southeast- ern.
Baraga. Chippewa. Delta. Houghton. Isle Royal. Keweenaw. Mackinac. Marquette. Menominee. Ontonagon. Schoolcraft.	Benzle. Gr. Traverse Leelanaw. Manistee. Manitou. Missaukee. Wexford.	Antrim. Charlevoix. Cheboygan. Emmet. Kalkaska. Otsego.	Alcona. Alpena. Iosco. Presque Isle Ogemaw.	Kent. Lake. Mason. Muskegon. Newaygo. Oceana. Osceola. Ottawa.	Barry. Clinton. Eaton. Genesee. Gratiot. Ingham. Ionia. Livingston. Montcalm. Shiawassee.	Clare. Gladwin. Isabella. Mecosta. Midland. Roscommon.	Bay. Huron. Lapeer. Saginaw. Sanilac. St. Clair. Tuscola.	Allegan. Berrien. Cass. Van Buren.	Branch. Calhoun. Hillsdale. Jackson. Kalamazoo. Lenawee. St. Joseph. Washtenaw.	Macomb. Monroe. Oakland. Wayne.

The replies by correspondents are grouped by geographical divisions of the State, shown in this exhibit, and alphabetically by localities within the divisions. This exhibit is printed here in order to aid in turning to replies from particular localities, without referring to the index, and that reference may readily be made to it, by page, from the exhibits which follow.

The weekly reports of diseases for the year ending September 30, 1877, the compilation of which is printed in this volume, are also compiled with reference to the geographical divisions stated above.

EXHIBIT 2.—*Indicating by Geographical Divisions of the State and by Localities, the Diseases of Increased and of Lessened Prevalence in Michigan during the year 1876, and the supposed causes of Increased and of Lessened Prevalence, as Compiled from the Replies of 45 Correspondents to Questions 3, 4, 5, and 6, of Circular 15 from the State Board of Health.*

Geographical Division. *	Locality.	Diseases of Increased Prevalence.	Supposed Causes of Increased Prevalence.	Diseases of Lessened Prevalence.	Supposed Causes of Lessened Prevalence.
STATE.	All Localities.	See Summary of Replies to Question 3, page 170.	See Summary of Replies to Question 4, page 170.	See Summary of Replies to Question 5, page 170.	See Summary of Replies to Question 6, page 170.
U. Penin..	Marquette.....	Remittent and typho-malarial fevers.	Continued rains of early summer and hot weather following.	Gastro-intestinal, of children.....	Unknown.
Western..	Grand Rapids.....	Consumption.....	Unknown.	All mild, except consumption.....	Better sanitary surroundings, drainage, etc.
Western..	Grand Rapids?	Membranous croup, diphtheria, and influenza.	Atmospheric changes, raw winds with dampness and snow.	Typhoid and malarious fevers.....	Improved sanitary conditions, better water and drainage.
Western..	Lamont.....	Consumption and accidents.....	Inherited susceptibility, aggravated by epidemics of measles, whooping-cough, and influenza, and by imprudence.	Scarlet fever and diphtheria.....	Better diagnosis.
Western..	Ludington.....	Cholera infantum, scarlet fever.	Neglect on part of parties in control.	Malarial fevers.....	High water.
Central...	Charlotte.....	Measles, intermittents and remittents, diphtheria.	Of malarial diseases, wet weather in early summer.	Typhoid fever, pneumonia, putreferal fever, dysentery, cholera infantum.	Unknown.
Central...	De Witt.....	Whooping-cough.....	Excessive moisture in spring and hot weather of summer.	None.	Unknown.
Central...	Hastings.....	None.....	Same as in 1875-6.....	Diseases of the respiratory and nervous systems, and of the brain.	Better houses, wells, and drainage; less use of parcloies and stimulants, owing to hard times.
Central...	Hubbardston.....	Fevers.....	In said section, decaying vegetable debris, stagnant water, poor dwellings.	Severe forms of lung, intestinal, and malarious diseases.	Better sanitary conditions.
Central...	N. Lansing.....	Scarlet fever.....	Unknown.....	In other sections, intermittent, remittent and other forms of fever.	Increased drainage.
Central...	Otisville.....	Scarlet fever, diarrhea of children. In one section, intermittent and typho-malarial fevers, and diarrheas.	None.....	Unknown.	Unknown.
Central...	Ovid.....	Chronic diseases in very old people.	None.....	Scarlet fever and measles.....	Filling and draining the low portions of the city.
Central...	St. Johns.....	None.....	None.....	Malarial fevers and dysentery.....	Climatic causes, improved drainage, and better hygiene.
Bay and E.	East Saginaw.....	None.....	Defective sewerage, and total absence of all police or sanitary regulations.	All zymotics.....	
Bay and E.	Lapeer.....	Dysentery, gastric fever, intermittent fever, and cholera infantum.	Unknown.	None.	Better and more abundant water supply.
Bay and E.	Port Huron.....	None.....		Cholera infantum and diarrhoea.	
Bay and E.	Port Sanilac.....	Croup and diphtheria.....			

Bay and E. Thornville....	Drainage of millpond.....	All others except influenza.....	Improved conditions, drainage, and residences especially.
S. West'n. Allegan ⁵	Scarlet fever, dysentery, whooping-cough, malarious fevers, and diphtheria.	Malarial fevers, diphtheria, and cerebro-spinal meningitis.	Better drainage, drying up of low and swampy land.
S. West'n. Allegan ⁶	None.....	Intermittent and remittent fevers.	Increased drainage.
S. West'n. Matamoras.....	None.....	Malarial diseases and their complications.	Dry weather.
S. West'n. Otsego.....	None.....	All, unless cerebro-spinal meningitis.	Hard times.
S. Central. Adrian.....	None.....	None.	
S. Central. Albion.....	Diphtheria.....	All diseases except diphtheria and consumption.	Better drainage of village, more equable season.
S. Central. Augusta.....	None.....	All, particularly zymotics.....	Climatic influences; more economical living.
S. Central. Blissfield.....	Membranous croup.....	Typhoid fever.....	Some knowledge of sanitary science.
S. Central. Brooklyn.....	None except malaria.	Pneumonia.....	Climatic influence.
S. Central. Beerfield.....	Malarial diseases.....	Typhoid fever.....	Unknown.
S. Central. Hillsdale.....	None.....	Pneumonia.....	Drainage, improvement of land, houses, clothing; less exposure.
S. Central. Kalamazoo.....	Bilious remittents.		
S. Central. Marshall.....	None.		
S. Central. Mendon ⁷	Typho-malarial fever.....	All zymotics except bilious and typho-malarial.	Unknown.
S. Central. Mendon ⁸	None.....	None, +	
S. Central. Tecumseh.....	Old age and erysipelas.	Cholera infantum.....	Fewer children to die of it.
S. Central. Three Rivers.....	Consumption.....	Malarial diseases.....	It not being a dry season.
S. Central. Ypsilanti.....	Lung diseases.....	Pneumonia.	Drainage, cultivation, and more intelligent care.
S. East'n. Dearborn.....	Mal-nutrition.....	Most malarial and febrile diseases.	Drainage, quality of food, state of air.
S. East'n. Detroit ⁹	Typhoid and malarial fevers, small-pox, and diphtheria.	All infectious diseases.....	No epidemic; greater regard to laws of health, on account of financial panic.
S. East'n. Detroit ¹⁰	Scarlet fever.....	Typhoid fever.....	Good drainage and pure water.
S. East'n. Milford.....	Old age and usual concomitant diseases.	Fevers of all types.....	Unknown.
S. East'n. Northville.....	None.....	Malarial and contagious.....	Improved drainage.
S. East'n. Utica.....	Age.....	None.	
S. East'n. Walcott Lake.....	None.....	All epidemic and contagious diseases.	Unknown.
S. East'n. Wyandotte.....			

* For a statement of the Geographical Divisions, see Exhibit I, page 171. † [See Fourth Annual Report of the State Board of Health, pages 41-52.—H. H. B., Sec'y.]

⁵ Much less sickness in last 5 years than formerly, say 25 years ago,—the decrease being due to diminution of cause of ague, improvement in food, clothing, and dwellings, in knowledge of sanitary conditions, and in medical treatment.

⁶ J. B. Griswold, M. D. ⁷ Arthur Hazlewood, M. D. ⁸ Nelson H. Chadlin, M. D. ⁹ Benjamin B. Ross, M. D. ¹⁰ H. S. Lay, M. D. ¹¹ Henry F. Thomas, M. D.

¹² H. C. Clapp, M. D. ¹³ Edwin Stewart, M. D. ¹⁴ Leartus Connor, M. D. ¹⁵ W. H. Rouse, M. D.

EXHIBIT 3.—*Indicating, by Localities in Michigan, the Diseases from which there was Increased Mortality, the Diseases from which there was Lessened Mortality during the Year 1876, and the supposed causes of Increased and of Lessened Mortality,—As Compiled from the Replies of 39 Correspondents to Questions 7, 8, 9, and 10 in Circular 15 from the State Board of Health.*

Geographical Division.*	Locality.	Diseases of Increased Mortality.	Supposed Causes of Increased Mortality.	Diseases of Lessened Mortality.	Supposed Causes of Lessened Mortality.
STATE.	All Localities.	See Summary of Replies to Question 7,—page 173.	See Summary of Replies to Question 8,—page 173.	See Summary of Replies to Question 9,—page 173.	See Summary of Replies to Question 10,—page 173.
U. Penin. Western Western.	Marquette. Ann Arbor. Grand Rapids.	None. No record. Consumption.	Unknown.	Gastro-intestinal of children. No record. All diseases except consump- tion.	Unknown. The very mild form of disease. Better sanitary surroundings, drainage, etc. The fewer cases.
Western. Western.	Grand Rapids. Lansing.	Croup and diphtheria. Consumption.	Increased number of cases. Inherited susceptibility, aggra- vated by epidemics of measles, whooping-cough, and influen- za, and by imprudence.	Typhoid fever.	
Western. Central.	Lansing. Charlotte.	None. Diphtheria and typho-malarial fever.	Unknown.	Malarial fevers. Typhoid fever, pneumonia, pu- erperal fever, dysentery, chol- era infantum.	Want of cause or disease. Unknown.
Central. Central.	Hastings. Holland.	None. None.	None.	None. Typhoid and typho-malarial fe- vers.	Poison not concentrated, fewer complications. Better sanitary conditions.
Central.	N. Lansing.	Scarlet fever.	Improper care and treatment.	Severe forms of lung, intestinal, and malarious diseases. Scarlet fever.	Sanitary measures and general mildness of the disease.
Central.	Otisville.	None.			
Central.	Ovid.	Membranous croup.	Unknown.	Unknown.	Lessened prevalence of disease.
Central.	St. Johns.	None.	St. Johns.	Malarial diseases.	Milder forms of the diseases.
Bay and E.	East Saginaw.	None.	East Saginaw.	Dysentery, scarlet fever, and diphtheria.	Climatic causes, improved drain- age, and better hygiene.
Bay and E.	East Saginaw.	None.	None.	All.	Unknown.
Bay and E.	Lapeer.	Dysentery, and infirmities of old age.	General prevalence of malaria.	Pneumonia, scarlet fever, croup, and diarrhoea.	Better and more abundant wa- ter-supply.
Bay and E.	Port Huron.	None.		Cholera infantum and diarrhoea.	
Bay and E.	Port Sanilac.	Consumption and croup.		Most diseases.	Milder type of scarlet fever.
Bay and E.	Thornton.	None.			Greater care.
S. West'n.	Allegan.	Scarlet fever.	Lack of sanitary conditions.	Scarlet fever.	Lessened amount of these dis- eases.
S. West'n.	Allegan.	Old age.	Old age.	Remittent, continued, and crup- tious fevers, diarrhoea and dys- entery.	
S. West'n.	Otsego.	None.		None.	
S. Central.	Adrian.	None.	Unknown.	All, except diphtheria and con- sumption.	More equable climate, less pre- valence of diseases.
S. Central.	Albion.	Diphtheria.		All, particularly summer com- plaints.	General mild type of disease.
S. Central.	Augusta.	None.			

	Cholera infantum and membranous croup.	Unknown.	Typhoid fever.	Less frequency of the disease.
S. Central. Blissfield	None.		No epidemic.	Unknown.
S. Central. Brooklyn	Consumption.	Possibly the wet season.	Malarial diseases.	Improved treatment, drainage of marshes.
S. Central. Deerfield	None.		Bilious diseases,—intermittent, remittent, and typho-malarial.	Less malaria, and greater care against spread of contagious diseases.
S. Central. Hillsdale	None.		None.	
S. Central. Marshall	None.		Malarial and febrile diseases, and all contagious diseases.	
S. Central. Mendon ⁸	None.			
S. Eastern. Dearborn	Consumption of lungs and cancer of stomach.	Uncommon and extreme changes of weather.		
S. Eastern. Detroit ⁹	Consumption.	Mental depression; from financial reverses; bad digestion, assimilation, respiration; confinement in bad air.	Scarlet fever and similar diseases.	No epidemic. Greater regard to laws of health, on account of financial panic.
S. Eastern. Detroit ¹⁰				Healthful surroundings.
S. Eastern. Milford	Scarlet fever.	Imperfect ventilation.	Typhoid fever.	Lessened prevalence of these diseases.
S. Eastern. Northville	Old age.		Pneumonia, scarlet and typhoid fevers.	Less sickness and milder forms of disease.
S. Eastern. Utica	None.		All	
S. Eastern. Wyandotte	None.			

* For a statement of the Geographical Divisions, see Exhibit I, page 171.

1. J. P. Griswold, M. D. 2. Arthur Hazlewood, M. D. 3. Nelson H. Clafin, M. D. 4. Benjamin B. Ross, M. D. 5. H. S. Lay, M. D. 6. Henry F. Thomas, M. D.
7. H. C. Chapp, M. D. 8. Edwin Stewart, M. D. 9. Leartus Connot, M. D. 10. W. H. Rouse, M. D.

7. In reply to question 7, 19 correspondents say that from no disease or cause of death has there been more than the usual mortality during the year 1876; "consumption" is reported by 6 correspondents to have caused more deaths in 1876 than usual; "diphtheria" is so reported by 3 correspondents; "scarlet fever", by 3; "old age and incident infirmities", by 3; "croup", by 2; "membranous croup", by 2; "typho-malarial fever", "dysentery", "cancer of the stomach", "cholera infantum", each by 1; 13 correspondents make no statement.

8. In answer to question 8, 5 correspondents say that they cannot give the cause of unusual mortality; 19 others give no cause, having stated, in answer to question 7, that from no disease was there unusual mortality; 15 make no statement. 9. In reply to this question, 3 correspondents say that from no disease or cause of death was there less than the usual mortality; 3, that there was less from "all diseases"; 6, less from "typhoid fever"; 5, from "scarlet fever"; 4, from "malarial diseases"; 3, from "dysentery"; 3, from "diarrhea"; 3, from "pneumonia"; 2, from "cholera infantum"; 2, from "remittent fever"; 2, from "typho-malarial fever". From each of the other diseases less than the usual mortality is reported by one correspondent; 18 correspondents do not reply.

10. In reply to question 10, 26 correspondents make no statement, 2 of them having stated in answer to question 9, that from no disease was there less than the usual mortality; 7 mention improved sanitary surroundings, and 13, the lessened prevalence of diseases, as causes of lessened mortality from different diseases.

*11 and 12. Of the 49 correspondents who reply to the circular, 5 make no statement in answer to question 11, and 2 make none in answer to question 12.

In answer to question 11, one says, "about 250 cases"; one, "about 100"; and one, "200 cases besides remittents which are endemic"—showing a misapprehension of the question. One says, "remittent and typho-malarial fevers quite prevalent; am unable to state the exact number of cases"; one, "a few cases of puerperal fever"; one, "many phagedenic ulcerations of the throat during April and May"; one, "a few cases of typho-malarial fever"; one, about 15 cases of mumps"; one, "many cases of scarlet rash, contagious, resembled mildest forms of scarlet fever, but no sequela"; one, "10 cases of dysentery; 100 of influenza"; one, "1 case spinal meningitis"; one, "200 cases of influenza". It is to be hoped that hereafter fewer replies may be so indefinite as "many cases" or "few cases".

The statements on the diseases named in the questions are summarized as follows:

Small-pox.—Concerning this disease, 2 correspondents do not reply; 42 state that there were no cases; and 5 report the disease as follows: one, "55 deaths"; one, "a few cases"; one, "5 cases"; and 2, "1 case" each.

Cholera.—Concerning this disease, 3 correspondents do not reply; 46 state that there was no case. No correspondent reported it present during the year.

Scarlet fever.—Concerning this disease, 12 correspondents do not reply; 11 say there was no case, and 26 report it as follows: one, "4 deaths"; one, "18 deaths"; 2, "many cases"; 7, "a few cases"; 15 give the actual or estimated number of cases,—the numbers ranging from 2 to 100, with an average of 26 cases.

Typhoid fever.—Concerning this disease, 15 correspondents do not reply; 10 say that there was no case; 24 report as follows: one, "7 deaths"; one, "8 deaths"; 6, "a few cases"; 16 give the actual or estimated number of cases,—the numbers ranging from 2 to 50, with an average of 10 cases.

Measles.—Concerning this disease, 13 correspondents do not reply; 15 say that there was no case; 21 report it as follows: one, "10 deaths"; one, "40 deaths"; 8, "a few cases"; 2, "many cases"; 11 give the actual or estimated number of cases,—the numbers ranging from 2 to 250, with an average of 52 cases.

Whooping-cough.—Concerning this disease, 10 correspondents make no statement; 7 say that there was no case; 32 report the disease as follows: one, "7 deaths"; one, "21 deaths"; 12, "a few cases"; 8, "many cases"; 10 give the actual or estimated number of cases,—the numbers ranging from 8 to 200, with an average of 65 cases.

Cerebro-spinal meningitis.—Concerning this disease, 10 correspondents make no statement; 24 say that there was no case; 15 report it as follows: one, "8 deaths"; one, "3 deaths"; 2, "a few cases"; 11 state the actual or estimated number of cases,—the numbers ranging from 1 to 20, with an average of 4 cases.

Diphtheria.—Concerning this disease, 14 correspondents make no statement; 10 say that there was no case; 25 report it as follows: one, "7 deaths"; one, "30 deaths"; 10, "a few cases"; 13 state the actual or estimated number of cases,—the numbers ranging from 2 to 75, with an average of 13 cases.

13. Question 13 asked concerning the diseases which "prevailed" in 1876.

* The figures beginning paragraphs refer to questions in Circular 15, printed immediately after this Summary.

Probably it would have been better to use the word *occurred* instead of "prevailed." This explains the reason why the largest number opposite any given disease, in Exhibit 4, is only 10 opposite pneumonia,—while the number of correspondents whose replies to this question are compiled is 46. The diseases reported, in reply to this question, by more than one correspondent in any month are tabulated in Exhibit 4, page 179.

The statements for the first few diseases named in each month seem to show what were the "prevailing" diseases in each month, Intermittent fever heads the list in May, June, July, October, and November; pneumonia, in February, March, and April; diarrhea and intermittent fever, in August and September; bronchitis, in December; and rheumatism, in January. Pneumonia is second on the list in January, November, and December.

It is believed that the value of such a table as this can be increased in each year, by improved methods of stating the question, and improvements in replies of correspondents as they become familiar with the work.

All of the 49 correspondents make some reply. Three, however, do not reply by months and, therefore, their statements are not compiled. Of the 46 correspondents whose statements are compiled, one gives replies for only the last five months of the year.

14. In reply to this question, 13 correspondents say that no disease not usually occurring in their locality was present in 1876, and that no disease was attended with an unusually high or low rate of mortality; 21 correspondents do not reply to the question; the others give useful replies which cannot well be summarized because of their dissimilarity.

17. In reply to this question, 27 correspondents say that no disease has prevailed among animals; 7 make no statement. The replies of the other 15 correspondents cannot well be summarized.

18. In reply to this question, 24 correspondents say that no disease has prevailed among crops; 3, make no statement; the other 22 give interesting replies, which are so dissimilar that they do not naturally fall into groups.

19. Of the 49 correspondents who reply to the circular, 6 make no statement in answer to this question; 32 say that the grains in question were marketed in good condition; the other 11 correspondents give definite replies, each different from the other.

20. In reply to this question, 25 correspondents say that none of the grains mentioned in question 19 was affected by fungus; 12 make no statement, 2 of them evidently being misled by an error in printing the circular, whereby the diseases in question were referred to as mentioned in question "15" instead of "19"; the replies of the 12 other correspondents are as follows: One says, "Wheat is somewhat affected with smut"; one, "All cereals were somewhat affected with smut"; one, "Wheat and late oats rusted; corn, very smutty, and early oats affected with smut"; one, "none, except smut in wheat"; one, "Not to any extent"; two, "not unusually"; one, "not generally"; one, "not noticeably"; one, "wheat"; one, "not more than common"; one, "I think not; only corn about as usual"; one, "all cereals were somewhat affected with smut."

21. To this question, 10 correspondents make no statement; 33 answer "yes"; one says, "In most cases, yes"; one, "Yes, generally"; one, "I think it was"; one, "Nothing to wet it"; one, "I believe it was"; and one, "It was not".

22. Of the 49 correspondents who reply to the circular, 13 make no statement in answer to this question; 12 say, "No"; one, "I think not"; and one, "They are not",—answers which are not very definite, but may have been intended to mean that the wheat was neither more nor less than usually liable to bank in the bin; 11 say, "less"; one, "more"; one, "neither"; one, "about an average"; one, "about the same"; one, "nothing unusual in this particular"; one, "they say that it is as mobile as usual"; 3, "no complaint"; one, "do not hear much complaint"; one, "does not bank".

23. Of the 49 correspondents who reply to the circular, 11 make no statement in answer to this question; 5 say that the hay crop was more than usually affected by mildew or mould; 9 say that it was less than usually affected; 4 say, "No", an indefinite reply, which may mean that the crop was *neither* more nor less than usually affected with mildew or mould; one says, "neither"; 11 say, in effect, that the hay was secured in good condition; 2, that it was secured in poor condition; and 6, that the early cut hay was more, and the late cut less than usually affected with mildew or mould.

24. Only 13 correspondents reply to this question. Of these, 7 give quite full tabular statements, for which see replies by Drs. J. S. Caulkins, H. F. Thomas, W. H. Rouse, G. J. Northrop, A. Hazlewood, E. N. Palmer, and J. M. Swift. The replies of the other 6 correspondents are as follows: "Very dry during almost entire year". "Storms severe, drouth also; so that twice, during the summer, crops suffered from too much wet and twice from drouth." "Winter exceedingly mild; spring, summer, and fall, unusually hot, especially June and July. Exceedingly wet until July 4. I think only 6 days in May that it did not rain. Two or three showers after July 4 to 10; from that time very hot and dry". "Noticed a marked falling off in the frequency of cholera infantum for two days after several thunder storms in July and August". "Atmosphere usually dry and heavy". "January, February, March, and April, unusually mild and moist; very little snow, mostly rain. May and June, warm and large amount of rain; summer months, quite hot."

* The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report

EXHIBIT 4.—Diseases in Michigan during the year 1876.—Giving by Months a Summary of the Replies to Question 13, Circular 15, by 46 Correspondents of the Board.

JANUARY.	FEBRUARY.	MARCH.	APRIL.	MAY.	JUNE.
Corresponding cases of.	Corresponding cases of.	Corresponding cases of.	Corresponding cases of.	Corresponding cases of.	Corresponding cases of.
Diseases.	Diseases.	Diseases.	Diseases.	Diseases.	Diseases.
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9
10	10	10	10	10	10
11	11	11	11	11	11
12	12	12	12	12	12
13	13	13	13	13	13
14	14	14	14	14	14
15	15	15	15	15	15
16	16	16	16	16	16
17	17	17	17	17	17
18	18	18	18	18	18
19	19	19	19	19	19
20	20	20	20	20	20
21	21	21	21	21	21
22	22	22	22	22	22
23	23	23	23	23	23
24	24	24	24	24	24
25	25	25	25	25	25
26	26	26	26	26	26
27	27	27	27	27	27
28	28	28	28	28	28
29	29	29	29	29	29
30	30	30	30	30	30
31	31	31	31	31	31
32	32	32	32	32	32
33	33	33	33	33	33
34	34	34	34	34	34
35	35	35	35	35	35
36	36	36	36	36	36
37	37	37	37	37	37
38	38	38	38	38	38
39	39	39	39	39	39
40	40	40	40	40	40
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100	100	100	100	100	100

EXHIBIT 5.—*Soil Moisture in Michigan by Months during the Year 1876, as indicated by the Replies of 33 Correspondents* to Questions 25 and 26 of Circular 15 from the State Board of Health.*

Geographical Division. †	Locality.	Soil Moisture by Months and without Reference to Previous Years.—(Question 25.)	Soil Unusually Dry. Time.—(Question 26.)	Soil Unusually Moist. Time.—(Question 26.)	Remarks in Answer to Question 26.
STATE.	All Localities.	‡	§	||	
U. Peninsular Western.....	Marquette.....	Great in May, June, July, Aug., and Sept. Very wet up to July 1; rather dry afterwards.	(rather) after July 1.	September. Up to July 1.	
Western.....	Cannonsburg.....	Very dry almost entire year.....	Almost entire year. Early September.....	June.	
Western.....	Grand Rapids 1.		August.....	June.	
Central.....	Charlotte.....	May, June, and first part of July very wet; balance of Summer and Fall very dry. Wells and springs are now (Jan. 10, 1877) very low.	At no time.....	At no time.....	No material difference.
Central.....	De Witt.....		July, Aug., & Sept.	April and May.	
Central.....	Hastings.....		Entire Autumn.....	May and June.	
Central.....	Hubbardston.....		July.		Soil was moist most of the season.
Central.....	Otisville.....	Quite wet from Jan. to June, and dry from June to Sept.; Sept. and Oct. moderately dry.	Entire Autumn.....		Seasons pretty uniform; wet Spring and dry Summer.
Central.....	Ovid.....	Fore part of season, excessively wet; last part, excessively dry.	July.		First half of May so wet that crops could not be sown; subsoil abnormally dry during whole year.
Central.....	St. Johns.....		July.		Last half about an average.
Bay and East.	East Saginaw 3.		May to Dec., except short time in Aug.	First half of May (surface soil).....	More moist than the last two years, but not exceedingly so.
Bay and East.	Lapeer.....	April and May unusually wet; Summer dry.	At no time.....	At no time.	
Bay and East.	Lexington.....	Deficient during entire year, except May and June.	Aug. and Sept.	First half of year.....	
Bay and East.	Port Sanilac.....			Spring and Fall.	
Bay and East.	Thornville.....			First half of year.	
S. Western.....	Allegan 4.....			First 6 m'ths of yr. Whole year.....	June and July excessively moist. Same months wet and dry in the two previous years, but not to so great an extent.
S. Western.....	Osago.....				
S. Central.....	Adrian.....				
S. Central.....	Albion.....				
S. Central.....	Blissfield.....	Wet, except in July, Aug., and Sept., when it was moist.			
S. Central.....	Brooklyn.....	First half of year, very moist; last half, quite dry.			
S. Central.....	Coldwater.....	Exceedingly wet till July 4; after July 10, very dry.			
S. Central.....	Deerfield.....				
S. Central.....	Hillsdale.....				

S. Central-----	Kalamazoo-----	Heavy rains in May and June; in Aug. and Sept. surface unusually dry. In 1875, water unusually low and many wells dry; but after the heavy rains of May and June, 1876, the water has been well up.				
S. Central-----	Marshall-----	A good degree of moisture.	-----	-----	Aug. and Sept.	
S. Central-----	Mendon ⁵ -----	Quite moist during entire year.	-----	-----	June and July.	
S. Central-----	Mendon ⁶ -----	Excessive in April, May, and June; in Aug. and Sept. very dry.	-----	-----	Apr., May, and June	Absolutely and relatively.
S. Central-----	Ypsilanti-----	Excessive during May and June.	-----	-----	-----	-----
S. Eastern-----	Dearborn-----	Very uniform throughout year.	-----	June and Aug.	-----	For the year greater than for the last
S. Eastern-----	Utica-----	More than for many years past.	-----	At no time.	-----	five years.
S. Eastern-----	Wyandotte-----	-----	-----	In Fall.	-----	-----

* Of the 49 Correspondents who reply to the Circular, 31 make no statement in answer to Question 25, and 20 make no statement in answer to Question 26.

† For statement of Counties in Geographical Divisions, see Exhibit 1, page 171.
 ‡ Soil moisture reported at some time of year 1876 by 14 of the 18 correspondents who reply to Question 25, as follows: In Jan., Feb., and March, by 7; in April by 8; May, by 12; June, by 12; July, by 3; in Aug., Sept., Oct., Nov., and Dec., by 2. † Fore part of season, by 1. Soil moisture reported deficient at some time of year 1876 by 10 of the 18 correspondents who reply to Question 25, as follows: In Jan., Feb., March, and April, by 2; in May, by 1; in June, by 3; in July, by 8; in Aug., by 10; in Sept., by 10; in Oct., by 7; in Nov., by 6; in Dec., by 5; last part of season, by 1. Soil moisture reported very uniform throughout year by 1, and more than for many years past, by 1 of the 18 correspondents who reply to Question 25.

§ Soil reported **unusually dry** at some time of year 1876 by 8 of the 29 correspondents who reply to Question 26, as follows: In Jan., Feb., March, and April, by 1; in May, by 2; in June, by 2; in July, by 6; in Aug., by 3; in Sept., by 3; in Oct. and Nov., by 5; in Dec., by 3; reported unusually dry *at no time*, by 3.
 || Soil reported **unusually moist** at some time of year 1876 by 16 of the 29 correspondents who reply to Question 26, as follows: In Jan. and Feb., by 6; in March, by 7; in April and May, by 10; in June, by 11; in July, by 3; in Aug., by 2; in Sept., by 4; in Oct. and Nov., by 2; in Dec., by 1; reported unusually moist *at no time*, by 3.

I. B. Griswold, M. D. 2 Arthur Hazlewood, M. D. 3 Nelson H. Claflin, M. D. 4 H. S. Lay, M. D. 5 H. C. Clapp, M. D. 6 Edwin Stewart, M. D.

25, 26. The questions as to soil moisture are questions of fact. They cannot be answered by a statement of the rainfall and cloudiness. With a given amount of rainfall the moisture of the soil depends on its previous saturation, on its power to absorb or to shed water, and on the saturation and movement of the air above it. Only actual and frequent observations as to the condition of the soil during the year can supply the important information desired on this point; and if the facts concerning soil-moisture be not only observed but recorded at regular intervals throughout the year, the report at the close of the year will have greater value.

This is the first attempt to get on record statements by months of the facts concerning this important subject; and, although the statements are not as complete this time as it is hoped they will be hereafter, it is thought best to tabulate them as is done in Exhibit 5, above.

EXHIBIT 6.—*Depth of Earth above Ground Water, and Relative Height of Ground Water, in Michigan, by Months, during the Year 1876,—as indicated by the Replies of 28 Correspondents * to Questions 27 and 28 of Circular 15 of the State Board of Health.*

Geographical Division, †	Locality.	Depth of Earth Above Ground Water. (Question 27.)	Ground Water Unusually High. Time.—(Question 28.)	Ground Water Unusually Low. Time.—(Question 28.)	Remarks and Irregular Replies, in Answer to Question 28.
STATE.	All Localities.	‡	§	||	
U. Peninsular...					
Western...	Marquette...	Most wells gave out.	June and September.		
Western...	Grand Rapids 1...	Usually the same	At no time.	At no time.	Governed by lake.
Western...	Ludington...				
Central...	Charlotte...	But little difference.	June and July.	At no time.	
Central...	Hastings...	Water in wells and springs unusually high in Spring and Summer; late in Autumn, shallow.	At no time.	At no time.	
Central...	Hubbardston...	Wells bored to a depth of 80 feet bring water to within 11 feet of surface. Wells 10 to 15 feet deep, dry during Aug., Sept., and Oct.	April and May.	July, August, Sept., and November.	
Central...	Otisville...	Usually 12 to 14 feet; would not vary more than 2 ft.			April. ‡
Central...	Ovid...	Wells in bed of quicksand of unknown depth, below 15 feet of solid clay; height of water in quicksand not affected by short dry spells.		Late in Autumn.	
Central...	St. Johns...	With a year or two of less than usual rainfall the water in the quicksand recedes possibly 10 or 15 inches.			
Bay and East...	East Saginaw 2	Twenty to 50 feet; depth of water in most wells varies from 2 to 5 feet.	At no time.	At no time.	
Bay and East...	Lapeer...	Six feet.			
Bay and East...	Port Huron...	Ground water became constantly lower from beginning of year till July, at which time there was a temporary rise; since Sept. 1 it has constantly become less, and at present, Jan., 1877, it is unprecedentedly low.	At no time.		
Bay and East...	Thornville...				
S. Western...	Allegan...		At no time.	At no time.	
S. Western...	Mattawan...	Water in all wells and streams higher, by 1 or 2 feet, than for the previous year, during April and May; lower during Sept.	At no time.	From March till Nov.	
S. Central...	Albion...	Six feet.	At no time.	At no time.	
S. Central...	Blissfield...	Jan., 10 ft.; Feb., 8 ft.; March, 4 to 6 ft.; April, 7 ft.; May, 6 ft.; June, 8 ft.; July, 7 ft.; Aug., 10 ft.; Sept., 12 ft.; Oct., 12 ft.; Nov. and Dec., about the same.	April and May.		
S. Central...	Brooklyn...	In most places, water on top of ground most of time.	First half of year.		
S. Central...	Deerfield...		July.		
S. Central...	Hillsdale...	Varies vastly in the county; but surface water was higher than in 8 years before.	May and June.		

		Average during year, about 16 ft.; depth of water in wells, 3 to 5 ft. About 20 ft. on an average; varies about 2 feet.	From March till about middle of August.	Jan., Feb., and March....	Remainder of year about an average.
S. Central.....	Mendon 3.....	Same as usual.	-----	-----	-----
S. Central.....	Mendon 4.....	In July and Aug. many wells ran dry.	-----	-----	-----
S. Central.....	Tecumseh.....	No wells very low at any time.	-----	-----	-----
S. Central.....	Three Rivers.....	In July and Aug. many wells ran dry.	-----	-----	-----
S. Central.....	Ypsilanti.....	Fourteen ft.; depth of water in wells, 2½ ft.; but little variation throughout year.	April and July.....	During the Summer.	-----
S. Eastern.....	Dearborn.....	No wells became dry this Summer or Fall, which is unusual; this fact apparently connected with unusual height of Detroit River.	At no time.	June and August.	-----
S. Eastern.....	Utica.....	-----	-----	-----	-----
S. Eastern.....	Wyandotte.....	-----	-----	-----	-----

* Of the 49 Correspondents who reply to this Circular, 27 make no statement in answer to Question 27, and 26 make no statement in answer to Question 28.

† For a statement of the Geographical Divisions, see Exhibit 1, page 171.

‡ Only one correspondent, E. N. Palmer, M. D., of Brooklyn, answers by months for the whole year; 10 explicitly or implicitly state the depth of earth above ground water; 3 state that there was little variation; 15 make statements as to variation.

§ Ground water reported **unusually high** at some time during the year 1876, by 10 of the 23 correspondents who reply to Question 28, as follows: In Jan., by 2; in Feb., by 2; in March, by 3; in April, May, and June, by 6; in July, by 5; in Aug. and Sept., by 2; in Nov. and Dec., by 1; reported unusually high *at no time*, by 7.

|| Ground water reported **unusually low** at some time during the year 1876, by 6 of the 23 correspondents who reply to Question 28, as follows: In Jan. and Feb., by 1; in March, by 2; in April and May, by 1; in June, by 3; in July, by 3; in August, by 4; in Sept., by 2; in Oct., by 1; in Nov., by 2; late in Autumn, by 1; reported unusually low *at no time*, by 7.

¶ Does not state whether high or low. It is hoped that hereafter replies may be more definite.

¹ J. B. Griswold, M. D. ² Nelson H. Claflin, M. D. ³ H. C. Clapp, M. D. ⁴ Edwin Stewart, M. D.

27, 28. The questions as to ground water cannot be answered by a mere reference to the amount of rainfall in the different months of the year. In many places the depth of earth above ground water, depends more on topographical conditions, and on the rainfall of previous years and seasons than on that of the given season; while in some cases it has a more immediate connection with the latter. The question can be answered only from actual observations, and to be of most value the answers should be based upon facts recorded at the time of observation. Such observations and records are not made without some care and labor, but one who has once made a study of the conditions of his locality in this respect can, with comparative ease, note any changes which may occur. Exhibit 6 has been compiled from the answers to questions concerning the ground water, for the year 1876. It has considerable value, especially as relates to the time of unusual conditions of ground water, as shown in the fourth and fifth columns, and which can be studied in connection with the diseases at such times in such localities. By the replies to question 27, in the third column, it will be seen that the question was not fully understood, or, if understood, few were prepared to answer it. Some of the replies to this question seem to apply more closely to other questions, but it has been found difficult to transpose them without risk of changing the author's meaning.

29. Of the 49 correspondents who reply to the circular, 33 make no statement in answer to this question. The other 16 give replies which may be briefly mentioned as follows:

Malignancy of 3 cases of typhoid fever attributed to nearness of house and well to barn.—See reply by G. W. Topping, M. D., De Witt.

Typhoid fever caused by contamination of water; and more especially, in the country, by impure air. Remedy, vigorous action by local Boards of Health.—See reply by H. W. Browne, M. D., Hubbardston.

Several cases of typhoid fever, one due to emanations from privy.—See reply by O. Marshall, M. D., North Lansing.

Intermittent and typho-malarial fevers and diarrheas caused by decaying vegetable *debris*, stagnant water, etc. Contagious influence of scarlatina. See reply by A. W. Nicholson, M. D., Otisville.

Perversions of liver secretions caused by *miasm* incident to undrained localities when first improved and exposed to sunlight and climatic changes.—See reply by Wm. R. Marsh, M. D., Bay City.

Impure water the most fruitful source of disease. Need of some common and safe source of water-supply, especially in larger villages.—See reply by Alfred Nash, M. D., Lapeer.

A number of deaths from diphtheria coincident with more than usual amount of ozone.—See reply by H. F. Thomas, M. D., Allegan.

People not prepared to submit to quarantine of scarlet fever; they need to be educated to it. They are too careless about privy vaults and contamination of wells.—See reply by Milton Chase, M. D., Otsego.

Much sickness in a tract of undrained land flooded with water, bearing the "wash" of many barnyards and several cheese factories.—See reply by Hal C. Wyman, M. D., Blissfield.

Diphtheria, diarrhea, and fever caused by using water contaminated by privy and pig-pen drainage, and water from wells near a marsh. See reply by W. B. Southard, M. D., Kalamazoo.

Cases illustrating contagiousness of diphtheria. Necessity of enforcing the same precautionary measures against diphtheria and scarlet fever as are applied in case of small-pox and cholera.—See reply by H. C. Clapp, M. D., Mendon.

Continued fever and deaths apparently caused by using impure water. Typhoid fever communicated to a whole family by a young man sick with it being brought to the house.—See reply by Edwin Stewart, M. D., Mendon.

Most of our sickness in dry weather caused by lowering water above dams in rivers.—See reply by C. W. Backus, M. D., Three Rivers.

Rags imported from Germany, France, and Italy, the source of small-pox in the paper mills of Ypsilanti.—See reply by Edward Batwell, M. D., Ypsilanti.

Two outbreaks of scarlet fever occurring near an old brickyard pond filled with stagnant water.—See reply by E. S. Snow, M. D., Dearborn.

Diarrhea, nausea, fever, and typhoid fever apparently from drinking water from a well in which was a dead toad.—See reply by Robert Johnston, M. D., Milford.

The Circular to which these replies have been made, is as follows:

[15.] CIRCULAR TO CORRESPONDENTS RELATIVE TO PREVAILING DISEASES IN 1876.

OFFICE OF THE STATE BOARD OF HEALTH, }
LANSING, MICHIGAN, December, 1876. }

To the Correspondents of the State Board of Health:

GENTLEMEN:—This Board desires to have, and to place upon record for purposes of future study in connection with records of deaths and of meteorological conditions, statements, for as many different localities in the State as possible, of the diseases prevailing during the year 1876. Will you have the kindness to send, as soon after December 31, 1876, as is convenient, to the office of this Board at Lansing, your replies to the following questions? Please use the stamped envelope enclosed herewith, and leave all additional postage to be paid at this office. In replying it will not be necessary to repeat the questions, but simply to refer to the Circular and to each question by number. Please define the locality for which your replies are made.

1. Among the people of your locality, and considering the increase or decrease of population, was the proportion of *sickness* from all causes during the year ending Dec. 31, 1876, *greater, less, or about the same as the average* during previous years? If not the same, how much was it increased or diminished?
2. Compared with previous years, and from all causes, was the proportion of *deaths* to inhabitants during the year 1876, *greater, less, or about the same as the average*? If not the same, how much was it increased or diminished?
3. What diseases, or causes of death, have been *more* than usually prevalent during the year 1876?
4. If you can assign any *cause* for the *unusual prevalence* of any disease, please do so.
5. What diseases, or causes of death, have been *less* than usually prevalent?
6. To what do you attribute the lessened prevalence?
7. From what diseases or causes has there been *more* than the usual mortality during the year 1876?
8. If you can assign any *cause* for the *unusual mortality* from any disease, please do so.
9. From what diseases or causes has there been *less* than the usual mortality?
10. To what do you attribute the lessened mortality?
11. State number of cases of small-pox, cholera, scarlet fever, typhoid fever, measles, whooping-cough, cerebro-spinal meningitis, diphtheria, and of any other epidemic, endemic, contagious or infectious disease that has appeared. (Facts are especially desired, but opinions are better than no statements, though it will be well to state them as opinions.)
12. Of the eight diseases mentioned above, *name those of which no case has appeared* during the year 1876.
13. Please give, by months, a summary statement of the diseases which have prevailed in the year 1876.
14. Please mention dates of the occurrence of any *disease not usually occurring in your locality*, and of any attended with an *unusually high or low rate of mortality*.

15. What diseases are prevailing at the time you send this statement?
16. Are any diseases now especially or unusually prevalent or fatal? If so, what diseases, and to what extent?
17. What diseases have prevailed, and to what extent, *among animals*?
18. What diseases have prevailed, and to what extent, *among the crops*, as of potatoes, hops, fruits, and especially cereals and grasses, whether affected by rot, rust, smut, bunt, mildew, or mould?
19. As regards rye, oats, corn, buckwheat, and other grains, wheat in particular, what was the actual condition when ready for market or use?
20. Were any of these grains, mentioned in question 15,* affected by any kind of fungus?
21. Was the wheat generally allowed to get thoroughly dry before it was threshed?
22. Do the wheat buyers or millers say that wheat this year is *more* or *less* than usually liable to "bank" in the bin?
23. Was the hay crop, secured during the past season, *more* or *less* than usually affected by mildew or mould?
24. Please give a summary statement of the meteorological conditions during the year 1876, specifying if possible, the general characters for each month, and noting any peculiar or unusual conditions.
25. Please state the facts concerning the *soil moisture* in your locality, by months, during the year 1876, without reference to previous years.
26. Compared with previous years, at what time of the year 1876 was the soil in your locality *unusually dry* or *moist*?
27. Please state the facts concerning the *depth of earth above the ground water* in your locality, by months, during the year 1876, as indicated by the depth of water and distance down to water, in wells, streams, etc., or by other facts.
28. Compared with previous years, at what time of the year 1876 was the *ground water* in your locality *unusually high* or *low*?
29. Please communicate facts bearing upon, or cases illustrating the causation or communicability of diseases.

Any suggestions which you may feel inclined to make, concerning methods which seem practicable, for the prevention of sickness, or deaths from removable causes, in your locality, or in this State, need not be withheld.

As stated parenthetically after question 11, in the absence of positive knowledge, opinions are desired. The fact that it will be difficult, and sometimes impossible to give the information asked for is well understood, but the importance of the subject warrants the effort which it is believed will not always be barren of results, but will tend to accumulate data which will eventually be of great value to the people.

By direction of the State Board of Health.

Very respectfully,

HENRY B. BAKER,
Secretary.

* [This should have been question 19 instead of 15.—H. B. B., Sec'y.]

The replies to this Circular are grouped by geographical divisions of the State, shown in Exhibit 1, page 171, and alphabetically by localities, within the divisions. The replies are as follows:

UPPER PENINSULAR DIVISION OF THE STATE.*

REPLIES BY GEO. J. NORTROP, OF MARQUETTE, MICH.

To the Secretary of the State Board of Health:

DEAR SIR:—In reply to Circular No. 15, relative to prevailing diseases, I have to report that, as far as I know:†

1. About the same as 1874 and 1875, but less than previous years by about 20 per cent, I think.
2. Believe it about the same as the average.
3. Remittent and typho-malarial fevers.
4. The continued rains of the early part of the Summer, and the hot weather following.
5. Gastro-intestinal diseases of children.
6. Unknown.
7. None.
9. Gastro-intestinal diseases of children.
10. Unknown.
11. Scarlet fever, epidemic in a mild form; cerebro-spinal meningitis, one; diphtheria, two, one fatal; remittent and typho-malarial fevers quite prevalent; unable to state the number of cases.
12. No small-pox, cholera, typhoid fever, measles, or whooping-cough,—my opinion.
13. Have not the data.
14. Remittent and typho-malarial fevers began in August and continued into December, with low rate of mortality.
15. Tonsillitis, bronchitis, influenza, and scarlet fever.
16. No.
17. Nothing so far as known.
18. Nothing.
- 19, 20, 21, 22, 23. Not applicable to this section.
24. Furnished by J. C. Rogers, Serg't Signal Service, U. S. A.:

MONTH.	THERMOMETER.			Prevailing Winds.	Rain and Snow, Water in Inches.	All Clear Days.	Days in which Rain or Snow fell.	REMARKS.
	Highest.	Lowest.	Mean Temperature.					
January	52°	-2°	21.1°	W.	0.60	12	11	Severe hail storm on May 21. More rain fell in June than in any month since September, 1872.
February	42°	-16°	16.7°	W.	0.65	11	11	
March	53°	-6°	22.1°	N. W.	1.70	13	10	
April	59°	12°	37.9°	N. W.	1.28	14	11	
May	86°	23°	49.4°	N. W.	3.84	16	12	
June	90°	37°	58.2°	S. E.	8.18	13	16	
July	98°	44°	66.9°	E.	3.07	12	13	
August	91°	44°	68.1°	S.	1.95	17	9	
September	76°	36°	54.8°	W.	4.22	13	9	
October	73°	28°	40.2°	W.	2.81	8	15	
November	58°	12°	34.8°	W.	2.32	7	10	
December	35°	-18°	1.76°	W.	0.82	8	10	
Year 1876....	98°	-18°	40.65°	W.	31.44	145	137	

* For counties included in each Division, see Exhibit 1, page 171.

† The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

25. I should say that it was great in May, June, July, August and September.
 26. I should say unusually moist in September.
 27. Don't know; the soil and subsoil are sand, and water is not long retained.
 28. If any change, should say unusually high in June and September.
 29. Nothing special observed.

Yours respectfully,

Marquette, Marquette Co., Mich., Jan. 9, 1877.

GEO. J. NORTHROP.

WESTERN DIVISION OF THE STATE.*

REPLIES BY C. L. CHAMBERLIN, M. D., OF CANNONSBURG, MICH.

Secretary of State Board of Health:

SIR:—For want of records I am unable to make a report that is satisfactory even to myself. †

1. According to my books, the proportion of sickness in this locality during the year 1876 was less, by 15 per cent, than in 1875.

2. 25 per cent less.

3, 4, 5, 6, 7, 8, 9. I have not kept a journal, and cannot tell.

10. The very mild form of disease.

11. No cases of small-pox, cholera, scarlet fever, typhoid fever, cerebro-spinal meningitis, or diphtheria; whooping-cough has been very prevalent, but very mild. I know of but two cases of measles during the year.

12. Small-pox, cholera, scarlet fever, typhoid fever, cerebro-spinal meningitis, diphtheria.

13, 14. I cannot.

15. Bronchitis, pneumonia, influenza.

16. See 15, prevalent but not fatal.

17. Influenza, among horses.

18. None that I know of.

19. Good; never better.

20. No.

21. Yes.

22, 23. Less.

24. I cannot do it.

25. Very wet up to the first of July, and rather dry afterwards.

26. See answer 25.

27, 28. I cannot answer.

Hoping in the future to be able to make a more intelligent report, I remain respectfully yours,

Cannonsburg, Kent Co., Mich., Jan. 26, 1877.

C. L. CHAMBERLIN, M. D.

REPLIES BY J. B. GRISWOLD, M. D., OF GRAND RAPIDS, MICH.

To the State Board of Health:

GENTLEMEN:—Herewith I send answers, so far as I am able to give them, to your Circular No. 15.*

1. Diminished, by probably 20 per cent.

2. Less; 422 in 1875; 388 in 1876; probably 10 per cent less.

3. Consumption, if correctly reported.

4. Am unable to do so.

5. All other forms of disease have been mild.

6. Better sanitary surroundings, drainage, etc.

7. Consumption, the only one.

8. I cannot.

9. See answer "5".

10. See answer "6".

11. I am unable to state the number of cases with any degree of accuracy.

12. Small-pox, cholera.

13. Cannot, except since September, with any accuracy.

14. There have been no such.

* For counties included in each Division, see Exhibit 1, page 171.

† The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

15. Influenza, pneumonia, bronchitis.
16. No.
17. None, to my knowledge, except distemper among horses.
18. None.
19. Very good, excellent.
20. No.
21. Yes.
22. Less.
23. Less; very dry when housed.
24. Have taken no observations.
- 25, 26. Has been very dry during almost entire year.
27. I only know that most wells gave out.
28. Cannot positively state.
29. Have no facts for the year.

Very truly yours,

Grand Rapids, Kent Co., Mich., Jan. 10, 1877.

J. B. GRISWOLD.

REPLIES BY ARTHUR HAZLEWOOD, M. D., OF GRAND RAPIDS, MICH.

Secretary State Board of Health:

DEAR DOCTOR:—Although it is next to impossible to answer Circular No. 15 with the accuracy necessary to form reliable conclusions therefrom, I will use the best data obtainable for the purpose.*

1. School census gives an increase of 500; probable increase of population, 1600 inhabitants. Sickness during first six months of year, average; last six months, diminished. Should estimate 35 per cent for the last 5 months, or about 12 to 15 per cent diminished for the year.

2. Less.

The burial permits granted for interments in the cemeteries, of persons who died within the city, is 385; for 1875 the number was 384.

From this data it would appear that only 1.35 per cent of our population died in 1876, whereas 1.42 per cent died in 1875. The source of inaccuracy in this estimate is to be found in the fact that some persons who died in this city during the time specified, have been removed elsewhere for burial; this number, however, cannot be more than a small fraction of all diseased persons, and the estimate, therefore, shows a very low rate of mortality.

3. Membranous croup, diphtheria, and influenza.

4. Atmospheric changes, raw winds, with dampness and snow; these may be only coincidences; no other cause was apparent.

5. Typhoid and malarious fevers.

6. Improved sanitary conditions, better water and drainage.

7. Croup and diphtheria.

8. The increased number of cases of these diseases.

9. Typhoid fever.

10. The fewer cases of this disease. See answer "6".

11. Have no means of ascertaining the number of cases of the diseases mentioned. The recorded deaths from these diseases are as follows:

DISEASES.	1875.	1876.	DISEASES.	1875.	1876.
Small-pox.....	None.	None.	Whooping-cough.....	7	7
Cholera.....	None.	None.	Cerebro-spinal meningitis.....	4	8
Scarlet fever.....	7	4	Spinal.....	3	2
Typhoid fever.....	26	7	Chicken-pox.....	0	1
Fever.....	1	6	Croup.....	7	23
Measles.....	6	10	Diphtheria.....	2	7

12. Small-pox, cholera.

13. January: Catarrhal affections of a light character, acute indigestion, diphtheria, measles.

February: Bronchitis, pneumonia, and as in January.

March: Bronchitis, pneumonia, measles, cerebro-spinal meningitis.

* The figures beginning paragraphs refer to questions in Circular 15, printed on pages 155-6 of this Report.

April: Bronchitis, pneumonia, measles, milder catarrhal affections.

May: Intermittent fever, light fevers of no special type.

June: Cholera infantum, infantile diarrhea, measles, colic, intermittent fever, whooping-cough.

July: Cholera infantum, dysentery, diarrhea, intermittent and remittent fevers.

August: Cholera infantum, diarrhea, dysentery, cholera morbus, influenza.

September: Intermittent fever, diarrhea, cholera infantum, influenza.

October: Intermittent fever, influenza, whooping-cough, measles, bronchitis.

November: Intermittent fever, influenza, membranous croup, pneumonia.

December: Influenza, bronchitis, diphtheria, intermittent fever.

14. The cases of membranous croup coming under my own personal observation occurred in the latter part of November and early part of December.

15. Common colds, and milder pulmonary affections, among acute diseases; chronic diseases.

18. From excessive moisture in some lands in our vicinity the crop of potatoes and corn failed to get a proper start, and the result was partial failure. Wheat and oats failed, in many instances, to fill the heads. Crop, therefore, light.

19. Wheat and oats light and inferior.

20. Not generally.

21. Yes.

22. Do not hear much complaint.

23. Hay usually secured in good weather and in good order.

24. By the courtesy of Mr. L. H. Streng, I enclose a copy of his memoranda of observations during the year:

MONTHS, 1876.	TEMPERATURE.—(Degrees F.)									PRECIPITATION.		PREVAILING WINDS.
	MEAN.						Max- imum.	Min- imum.	Range.	Rain and Melted Snow. Inches.	Snow, in Inch's.	Direction and Days.
	7 A. M.	2 P. M.	9 P. M.	Month- ly.	High- est Daily.	Low- est Daily.						
Year.	44.09*	54.14*	46.28*	47.72*	82.50	-0	94.	-5.	99.	35.14	49.75	s. w., 68; w., 43.
Jan..	28.	34.58	31.74	31.57	55.	13.	62.	9.	53.	2.64	4.75	s. w., 10.
Feb..	24.52	32.28	28.86	28.56	49.	9.75	60.	2.	58.	1.76	5.5	s. w., 6½; w., 6½.
Mar..	26.	34.74	29.58	29.97	56.50	14.75	60.	6.	54.	2.64	14.5	n. w., 6.
April	41.	52.70	44.06	45.92	65.	32.25	74.	24.	50.	1.97	-----	s. w., 7 w., 7½.
May..	54.55	68.10	56.10	58.71	75.	45.75	89.	35.	54.	4.71	-----	w., 10½.
June	66.93	77.03	65.56	68.78	79.	53.75	89.	50.	39.	7.82	-----	s. w., 10.
July..	71.39	82.93	71.10	74.13	82.50	64.	93.	58.	35.	3.74	-----	s. w., 8½; w., 7½.
Aug..	68.10	83.39	69.64	72.69	82.	58.25	94.	48.	46.	0.76	-----	s. w., 9½.
Sept.	55.23	66.70	56.10	58.53	70.	45.50	80.	43.	37.	4.39	-----	e., 9.
Oct..	41.26	51.80	45.29	45.91	61.25	32.75	69.	28.	41.	0.57	-----	w., 11.
Nov..	35.47	41.70	38.23	38.40	56.75	19.25	57.	16.	41.	2.32	6.	s. w., 6½.
Dec..	16.64	23.68	19.10	19.49	36.75	-0	40.†	-5.†	45.	1.81	19.	s. w., 9½.

* [Average of the monthly, not of the daily, means (made in this office).—H. B. B., Sec'y.]

† (12th.) ‡ (16th.)

26. In June, the soil was unusually moist; in early September, very dry.

I have no data from which to give answers, or even opinions, with reference to the other questions.

Very respectfully,

Grand Rapids, Kent Co., Mich., Jan. 26, 1877.

A. HAZLEWOOD.

REPLIES BY J. C. McILVAIN, M. D., OF LAMONT, MICH.

Secretary of State Board of Health:

In answer to Circular No. 15, I am sorry that you request an immediate answer. Many of the questions asked require, for a proper response, considerable time and labor.*

1. In this locality, the year 1876 has been characterized by unusual good health. During most of the year 1875, two physicians were very busy; while in 1876, one physician alone did not have as great a ride as he did the previous year, and this, notwithstanding the fact that the area of the ride had been extended considerably.

2. Notwithstanding the fact that there was less sickness in this year, there were nearly as many deaths as in the previous year. Fatal accidents have helped to swell the mortality; for instance, two accidental deaths by hanging; one person shot through the heart last week by accidental discharge of pistol; one, burned to death; one, drowned.

3. Consumption has caused more deaths than any other two diseases. One family, consisting of four persons, have all died of consumption, two within six months. There are many cases of consumption in this vicinity at the present time. You ask me to assign a cause for the unusual prevalence of this disease. This I would not venture to do, did you not ask it; for I have no means of taking statistics and of following out the history of individual cases. But first, I believe that people inherit (not consumption) but a tendency or a susceptibility to its influence. Within two years, an epidemic of measles was very prevalent and widespread throughout this section. This occurred during an open Winter, with notable changes of temperature. This was immediately followed by a severe epidemic of whooping-cough; and now this Fall witnesses a severe epidemic of catarrhal fever or influenza. A succession of favorable opportunities has been presented for the invasion of the lungs by this disease. Invasion cannot occur where the powers are fully capable of resistance, and the vitality of organs must be lowered in proportion as they suffer from disease.

I have noticed the fact that most cases of consumption are developed (in this locality) in persons who have sowed great fields of wild oats,—young ladies in the habit of attending country dances, full of life and activity, and young men who have the name of being “wild.” So much is this the case, that it is difficult to convince friends that it is not the direct result of dissipation.

5. There has not been a case of scarlet fever, and but one of diphtheria, in this locality for two years.

6. I do not really consider it a lessened prevalence, in fact, so much as I do a lessened amount of something else. It is well known, and I have observed for years, that a certain class of practitioners are always called upon to treat the most formidable diseases. Their nosology differs somewhat from mine. Every sore throat is diphtheria, and every ephemeral rash is scarlet fever.

7. Consumption.

8. See answer “4”.

9. See answer “6”.

10. —.

11. Typhoid fever, 2; measles, 50; whooping-cough, 150; cerebro-spinal meningitis, 1; influenza, 200.

12. Small-pox, cholera, diphtheria, and scarlet fever.

13. See by weekly report.

14. No instance.

15. Influenza.

16, 17. None.

I have no meteorological records. Grains, cereals, and roots, all right generally.

I think it bad to feed soft corn, so called. It is almost sure to mould, and I have known sickness to occur in animals fed soft corn. I think the late peachblow potato never gets ripe in northern Michigan. Its tops are always killed by frosts. Potatoes are attacked by bugs, underground, sometimes forming a nucleus for dry rot. Apples are not keeping well.

In my opinion, poverty and ignorance are the cause of more disease than is generally credited to them. I don't think people can be too well clothed, fed, or warmed. There is a notable increase of sickness of poor people in the Winter.

Respectfully,

Lamont, Ottawa Co., Mich., Dec. 31, 1876.

J. C. McILVAIN.

* The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

192 STATE BOARD OF HEALTH—REPORT OF SECRETARY, 1877.

REPLIES BY E. N. DUNDASS, M. D., OF LUDINGTON, MICH.

Secretary of the State Board of Health:

DEAR SIR:—The following are my replies to Circular 15, relative to Prevailing Diseases, 1876. They are for the city of Ludington and vicinity.*

1. Average less, about 25 per cent; last year we had scarlet fever, this year none.
 2. Diminished about 25 per cent.
 3. Cholera infantum, in warm months; scarlet fever, in Spring of 1876.
 4. Scarlet fever spread; cause, neglect on part of parties in control.
 5. Malarial fevers.
 6. High water.
 7. None.
 9. Malarial fevers.
 10. Want of cause or disease.
 11. About 250 cases.
 12. Small-pox, cholera, cerebro-spinal meningitis, diphtheria.
 13. For the first three months we had scarlet fever; in August, September, and October, cholera infantum.
 14. Scarlet fever as an epidemic.
 15. Nothing special.
 - 16, 17, 18. No.
 19. Good.
 20. No.
 21. Yes.
 - 22, 23. No.
 24. I have no means of giving a correct description; atmosphere usually damp and heavy.
 25. Soil usually more moist in the first half-year; last, dryer.
 26. Answered in "25".
 27. Ground water usually the same, governed by the lake.
 28. Water about the same every year, governed by the lake.
 29. No facts to give.
- Ludington, Mason Co., Mich., Jan. 20, 1877. E. N. DUNDASS, M. D.

CENTRAL DIVISION OF THE STATE.†

REPLIES BY G. B. ALLEN, M. D., OF CHARLOTTE, MICH.

Answers to Circular 15, relative to prevailing diseases, for Charlotte and vicinity.*

1. About the same as the average for previous years.
2. Less; diminished about 5 per cent.
3. Measles have been more than usually prevalent the past year. Malarial diseases of intermittent and remittent types. Diphtheria has been cause of more deaths.
4. I cannot, except for malarial diseases, which were developed from the wet season early in the Summer.
5. Typhoid fever (enteric), pneumonia, puerperal fever, dysentery, cholera infantum.
6. I do not know.
7. Diphtheria, typho-malarial fever.
8. I cannot.
9. The same as in answer "5".
10. I do not know.
11. No small-pox, no cholera; about 5 of scarlet fever; of typhoid fever, I do not know; I should judge about 250 cases of measles, as it was very general; whooping-cough, not very many; I know of no cases of cerebro-spinal meningitis; about 75 cases of diphtheria; I cannot give any facts in regard to these cases as to actual numbers, for the reason that physicians have not reported their cases. I can only make an estimate from a personal judgment.
12. Small-pox and cholera.
- 13, 14. I have no data.
15. Bronchitis, influenza, diphtheria, pneumonia, rheumatism.
16. No.
17. I think there has been no disease prevalent among animals.

* The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

† For counties included in each Division, see Exhibit 1, page 171.

18. No diseases prevailed to any extent. These crops were light, except grasses.
19. Rye is not raised to any extent in this section; oats were fair, their weight was light when threshed; corn was a "short" crop, much of it was killed by wet weather in June and July, and was not properly worked, owing to other work then pressing farmers; much of the crop was injured by the early frosts and was brought into market in a soft condition; buckwheat was, in this vicinity, almost entirely killed by frosts, and but little ripened and was harvested; wheat was a good crop and was brought into market in a good condition, except that the berry was "shrunken".
20. I do not see that these grains were mentioned in "question 15",* but I believe they were not affected by any kind of fungus.
22. They say it is less liable to "bank" in the bin.
23. Clover hay, cut in its season, was more than usually affected by mold and mildew. Timothy and red top cut in their season were less affected.
24. No data.
25. I cannot state facts.
26. In June the soil was unusually moist; in August it was dry.
27. I cannot state facts.
28. In June and July it was high; at no time has it been unusually low.
29. I have no facts to communicate.

Respectfully,

Charlotte, Eaton Co., Mich., Jan. 18, 1877.

G. B. ALLEN, M. D.

REPLIES BY G. W. TOPPING, M. D., OF DEWITT, MICH.

Secretary of State Board of Health:

DEAR DOCTOR:—I herewith submit the following replies to Circular No. 15. Though in many of the replies I make no pretence to accuracy, some of them are quite correct and all are as nearly so as the limited number of facts in my possession could make them.†

1. A decrease of 25 per cent from the average of the last six years, and of 15 per cent from the sickness of last year, by actual calculation from my own practice.
2. About the usual proportion of deaths.
3. Whooping-cough was unusually prevalent, but there have been but few deaths from it, and none, so far as I know, except where there has been some intercurrent disease, like pneumonia or acute bronchitis.
- 5, 6. Cannot say.
- 7, 8, 9, 10. Have no data by which I can answer these questions.
11. No cases of small-pox or cholera; probably about 6 cases of scarlet fever, and about the same number of cases of typhoid fever; eight cases of measles; a good many cases of whooping-cough, probably about 50 within five miles of DeWitt village; no cases of cerebro-spinal meningitis; about three of diphtheria; a few of mumps, I should think about 15.
12. No cases of Asiatic cholera, small-pox, or cerebro-spinal meningitis.
13. January: Pneumonia, bronchitis, rheumatism, porrigo, eczema, abortion.
February: Pneumonia, bronchitis, rheumatism, valvular disease of heart, œdema, pericarditis, eczema, keratitis.
March: Bronchitis, pneumonia, rheumatism, pericarditis, disease of valves of heart, dropsy, measles, tonsillitis, metrorrhagia, whooping-cough, keratitis.
April: Bronchitis, pneumonia, rheumatism, neuralgia, paraplegia, whooping-cough, scarlatina, eczema, gastralgia, scrofulous abscesses, tonsillitis, keratitis.
May: Bronchitis, whooping-cough, pneumonia, keratitis, rheumatism, amenorrhœa, retention of urine, gonorrhœa, endocervicitis, intermittent fever, dysmenorrhœa, chlorosis, paraplegia.
June: Whooping-cough, bronchitis, intermittent fever, remittent fever, rheumatism, gonorrhœa, abortion, chlorosis, erythema nodosum.
July: Intermittent fever, remittent fever, typho-malarial fever, whooping-cough, diphtheria, pneumonia, rheumatic arthritis, typhoid fever, diarrhœa, dysentery, capillary bronchitis, erysipelas, hysteria, opium poisoning, abortion, gonorrhœa, etc.
August: Typhoid fever, typho-malarial fever, intermittent fever, remittent fever, whooping-cough, diarrhœa, dysentery, cholera infantum, rheumatic arthritis, pneumonia, rheumatism, asthma, erythema nodosum, gangrene, bronchitis, neuralgia, gastralgia, etc.

* [This should have been printed in the circular, question 19.—H. B. B., Sec'y.]

† The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

September: Typhoid fever, typho-malarial fever, remittent fever, intermittent fever, diarrhœa, dysentery, cholera infantum, whooping-cough, bronchitis, dyspepsia, inflammation of the mouth, jaundice, eczema, pityriasis, lichen, enlargement of the spleen.

October: Typho-malarial fever, remittent fever, intermittent fever, whooping-cough, bronchitis, pneumonia, jaundice, diarrhœa, dysentery, retention of urine, abortion, spermatorrhœa, acne, erysipelas, rheumatism, pulmonary consumption, neuralgia, gonorrhœa, etc.

November: Whooping-cough, bronchitis, pneumonia, asthma, erysipelas, gangrene, retention of urine, gonorrhœa, onychia, eczema, enlargement of the spleen, anemia, rheumatism, intermittent fever, pulmonary consumption, herpes, eczema, goitre, synovitis, sciatica, dysmenorrhœa, endocervicitis, remittent fever.

December: Whooping-cough, bronchitis, pneumonia, asthma, tonsillitis, pulmonary consumption, rheumatism, intermittent fever, erysipelas, scarlatina, parotitis, goitre, herpes, neuralgia, endocervicitis, dysmenorrhœa, enlargement of the spleen, chronic diarrhœa, œdema, emphysema, prostatitis, spermatorrhœa.

The above statement of diseases prevailing during the different months of the year has been gleaned entirely from my own practice; but it is presumed that it includes all the diseases prevailing in this vicinity, for the several months named.

14. See answers "4" and "13".

15. Whooping-cough, parotitis, scarlatina, bronchitis, tonsillitis, rheumatism, enlargement of the spleen, goitre, pulmonary consumption, asthma, emphysema, spermatorrhœa, catarrh.

16. Whooping-cough is very prevalent, but not very fatal.

17. In the latter part of September last, five horses died quite close together, in the stables of two farmers living in the townships of Riley and Olive, about four miles from this village. The veterinary surgeons in attendance did not agree as to the diagnosis of the disease, though it was generally conceded that they were all sick of the same disease. I saw two of these horses and described their symptoms in a letter to the Secretary of the State Board of Health.* Messrs. Pike and Fletcher made a post mortem examination of two of these horses, and found the tissues about the pharynx and roots of the tongue full of little grubs resembling bots; some of the same grubs were found in the stomach of one of the animals, which was killed and examined immediately after death.

18. Have not heard of any general disease of crops in this vicinity.

19. Good, so far as I know.

20. I do not understand "question 15" † to refer to grains at all.

21. Yes.

22. I hear no complaints from millers or wheat-dealers about its "banking".

23. There is a great deal of hay injured by the wet weather, especially clover hay.

24. I cannot.

25. May, June, and the first part of July were very wet; the balance of the Summer and Fall was very dry. Wells and streams are now very low.

26. Answer "25" contains all I can give upon that topic.

27. I cannot.

28. I cannot say.

29. In one family where there were three cases of typhoid fever and two deaths, I attributed the malignancy of the disease largely to the nearness of the house and well to the barn, hen-house, and privy,—the two first being within 20 and 30 feet respectively of the last two.

De Witt, Clinton Co., Mich., Jan. 10, 1877.

G. W. TOPPING.

REPLIES BY A. P. DRAKE, M. D., OF HASTINGS, MICH.

Secretary of State Board of Health:

DEAR SIR:—Below find answers to questions of Circular No. 15, as full as my opportunities of observation will permit. ‡

* [This letter and a description of the appearance of the diseased part and of the bots were forwarded to the Secretary of the State Board of Agriculture, as being more pertinent to the work of that Board, and it is expected that they will be published in the Report of that Board for the year 1877.—H. B. B., Sec'y.]

† [This should have been printed in the Circular, "question 12."—H. B. B., Sec'y.]

‡ The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

- 1, 2. About the same as the average.
3. Nothing unusual.
- 4, 5, 6, 7, 8, 9, 10. No marked difference.
11. I have no means of knowing definitely; there have been but few cases.
12. Small-pox and cholera.
13. I have kept no record.
- 14, 15, 16. Nothing unusual.
17. Some form of epizooty slightly in Dec., 1876.
18. Not any.
19. Prime.
20. No.
21. Yes.
22. No; good.
23. Clean and dry.
24. I have no means of knowing.
25. I cannot.
26. No material difference.
27. But little difference.
28. No great extreme.

Respectfully yours,

Hastings, Barry Co., Mich., April 6, 1877.

A. P. DRAKE, M. D.

REPLIES BY H. W. BROWNE, M. D., OF HUBBARDSTON, MICH.

Secretary State Board of Health:

For reasons and causes which were beyond my control, I have been unable to make an earlier reply to your circular No. 15, relative to the prevailing diseases in 1876, and the same causes will now prevent me from making as full and satisfactory replies as I could wish.

1. Greater.
2. About the same as the average; I cannot make accurate statement.
3. Of specific diseases, fevers.
4. Excessive moisture in the Spring months, followed by hot weather of Summer.
5. Diseases of the respiratory system; diseases of the brain and nervous system.
6. Better houses, good wells, better drainage, perhaps less excessive general use of narcotics and stimulants, owing to the "hard times".
7. I do not know of any disease, or class of diseases, from which there has been an unusual mortality. There have been deaths from the several diseases prevalent during the year.
8. No unusual mortality.
9. I should say that, considering the number of cases, there had been less than the usual mortality from typhoid and typho-malarial fevers.
10. The fact that the cause was diffused, if one might so express it. There was no concentrated poison acting upon any large number of persons collected together in the same conditions, to be exposed to its influence; that is, not an epidemic of the disease, in a proper sense. Also the cases were not so severe as are sometimes observed, and there were less complications, especially of the respiratory system.
11. No case of small-pox, cholera, scarlet fever; of typhoid fever, there were several sporadic cases in the vicinity; I cannot state the exact number; no case of measles; whooping-cough, a few cases; cerebro-spinal meningitis,—I am of the opinion from the description I have heard, there has been one case, but did not see it; I have heard of two cases of diphtheria.
12. Small-pox, cholera, scarlet fever.
13. I cannot.
14. None.
15. No prevailing disease, at this time.
16. I have learned of none.
17. None, in this section.
18. None.
19. Rye, none raised; oats, corn, good; buckwheat, a short crop; wheat was of a good quality, in good condition.
20. Not that I am aware of.
21. In most cases, yes. Some, I think thresh too early in the season. There are so many "machines" in use at the present time that it would appear to be easy to allow time for the wheat to get thoroughly dry before threshing.
22. Does not bank.
23. Less.

24, 25.* I cannot.

26. I should think that in the months of April and May the soil was unusually moist.

27. I cannot. I can say in a general way, that in the Spring and early Summer water in wells and streams was unusually high; but late in Autumn the wells and streams were very shallow, and the depth of earth above the ground water was correspondingly great.

28. In the months of April and May, unusually high, I should think.

29. As typhoid fever has been mentioned, I might say we had several cases of that disease, in this section,—not an epidemic, but sporadic cases, as we might say, occurring in different localities and without any apparent connection with each other, and not deriving their origin from any common source. This fever has been diagnosed by many physicians as a mixture or hybrid of typhoid and malarial fevers, and for the reason that it is not uniform in its course or character. In some cases the malarial element may predominate, and in others the typhoid element may predominate; but I do not think it is malarial disease complicated by typhoid element.

Last Fall I saw many cases in which there was a gradual development followed by continued fever, diarrhea, with yellow colored discharges, tympanites, tenderness, and gurgling in iliac regions, epistaxis, and eruption, characteristic of typhoid fever, and yet having during course of disease marked remissions in everything *but the temperature*, as indicated by thermometer. Many practitioners are perplexed by these cases. I think they are a sort of hybrid with the typhoid and malarial fevers, the typhoid influences predominating. There is often delirium and great implication of the nervous system. My diagnosis is typhoid fever. I do not get opportunities to verify upon the cadaver; but I make no doubt these are cases of typhoid fever, but they may be obscured by being concomitant with periodical fever. I know I have seen cases diagnosed remittent fever, which were nothing else but typhoid. It is a common thing to hear it remarked, even by physicians, "we don't get any marked cases of typhoid in this country." They don't think it is typhoid, if the tongue is not dry and fissured. But I have seen these cases in which the tongue was neither cracked nor brown throughout the disease, which lasts from one to six and eight weeks. Murchison's cases probably did not occur in malarious districts.

In one case, in a family of ten, four of the family contracted the disease and one died. In this case there was a cellar, or cellar hole, under the house, which was originally planked up, but had caved in, near the door entering the kitchen: here the slops were thrown out, and ran down into the cellar, and spread out upon the ground under the house, where the gases, arising from this fermenting mass of filth, confined by the cellar walls and house floor, and thus excluded from the disinfecting power of the winds, permeated the house, and were probably the cause of the infection. The disgusting odor of decomposition had been long perceptible to the family, but had excited no anxiety as to the cause. The cellar cleaned out, the slops and filth carried away and buried, the health of the family was restored, with the exception above stated, and has remained good to the present time.

Two cases of the fever were traced to the use of water which was found to contain organic matter. In one case the well was simply a tub placed in the ground. At times the water was high and the tub would be under water, and surface water would mix with that of the well; and again, the water would fall, and then a portion of the tub would be above water. In this condition of things it was impossible but that fungi should be generated upon the walls of the tub; also that organic matter should not be carried into the well by the surface water. There were many things in the surroundings not consistent with the best state of health. The family here consisted of a man and wife and two small children. The man was taken sick in March last, and continued sick three months with a low fever, diagnosed typhoid, and is now (June) slowly convalescing. The children, both quite young, were sick during the Winter with a mild form of the same disease. The mother, youthful and vigorous, and not using much of the water, escaped. A complication, or rather a duplication of the supposed cause of disease in this case, is the fact that the dead body of a horse was hauled into the woods (about 40 rods from the house, which was to leeward of the woods) and left there to decay. It was hauled there in January, I think, and the wind, blowing from the north-west, bore constantly to the nostrils of this household an odor which was intolerable. It moved upon them every time the door was opened. I think there was but one door which was used in the Winter season, and two small windows. When this family ceased to use the water of their "well", and when the bones of the dead horse had whitened, this family recovered their health.

* The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

It may be remarked that the above is a true picture of the home life of far too many of the dwellers of "the woods",—those of small means and less energy and vim, who come to "clear up" a forty, or more rarely an eighty, and prepare the way for those with larger means and experience, and more ambition to rise. The well is usually a hole in the ground, or the source of water-supply is a spring in which surface water and washings freely commingle. The water usually tastes and smells bad, and when freely used cannot but be productive of disease. The house is poorly constructed, without regard to hygienic principles, and if it is of logs with one, or at the most, two small windows. The door, for often there is but one, is located in that part where it will be most convenient for the work, which, under all circumstances must be performed. The sleeping apartment is but a dark closet, and so on. That men and women live and apparently thrive under such conditions, deprived of a due supply of light, pure air, and pure water, is no proof of the advantages of such circumstances of human existence; it only exhibits, as far as it goes, the powers of nature, and of life-force. But perhaps, after all, there may be less danger to life and health *here* than lurks, unsuspected, in the luxurious homes of those more fortunate (?) individuals who dwell in more pretentious habitations, having all the modern improvements.

By far the most common and fertile source of contagion in typhoid fever, is, in my opinion, air-contamination, air poisoned by mephitic gases evolved from overflowing cesspools, privy-vaults, and pig-sties. The relation of those to the water-supply has been mentioned above; and many cases of this disease can, no doubt, be shown to have resulted from the use of impure water. Still I am of the opinion that this cause, in the "rural districts," at least, is not so general as air-contamination. In many of our villages, during the Summer months, the air is foul with putrescent gases, and after some weeks of a high temperature, one passing along to leeward of the rear of the street, is saluted with a stench which would cause him to exclaim with Lear, "Give me some civet, good apothecary, to sweeten my imagination." As the contents of these cesspools and privy-vaults are not, in this section at any rate, considered valuable for manure, it happens that these receptacles for filth and rottenness, in many cases are not discharged of their contents for years; and thus air, and too often water, become contaminated, unfit to preserve life and health, and when the pestilence comes, and hurries its victims to death, *then* men stare, and are distracted, and ask the cause of such dangerous diseases.

As to the remedy, it seems that much might be accomplished through systematic and vigorous action of the local boards of health (now that the law has been amended so as to make it obligatory upon such local boards to organize) in executing the laws. "The board of health shall examine into all nuisances, sources of filth, and causes of sickness, that may, in their opinion, be injurious to the health of the inhabitants within their townships, or in any vessel within any harbor or port of such township,—and the same shall destroy, remove or prevent, as the case may require." They should require all cesspools and privy-vaults to be cleaned out at least once a year, and disinfected as often as the health officer shall deem expedient; see that the lanes, rear walks, and enclosures of villages are kept clear of offal and refuse; and exercise such supervision over the carrying on of trades and employments dangerous to the public health, as the circumstances of the case may require.

Hubbardston, Ionia Co., Mich., May 30, 1878.

H. W. BROWNE.

REPLIES BY O. MARSHALL, M. D., OF NORTH LANSING, MICH.

Secretary State Board of Health :

DEAR SIR:—The following replies to questions in Circular No. 15, "Relative to prevailing diseases for the year 1876", are for the territory included in the first ward, and the north parts of the fourth and fifth wards, city of Lansing, and four to six miles into the adjoining townships of Lansing, DeWitt, Watertown, and Delta.

1. In my own practice, there was a decrease of 15 per cent, which was about the average with other physicians, as far as I was able to learn.

2. About 15 per cent less.

3. Scarlet fever.

4. The same as produced the scarlet fever epidemic of 1875-6, of which a full report was given last year.*

5. The year was remarkable for the absence of the severe forms of lung, intestinal, and malarious diseases.

6. Probably better sanitary conditions.

7. Scarlet fever.

8. The cause of death in scarlet fever may be the natural malignancy of the disease,

* [In the Fourth Annual Report of the State Board of Health, pages 41-52.—H. B. B., Sec'y.]

bad sanitary conditions surrounding the patient, or some peculiar depraved condition of the body in individual cases; but more often I believe it to be improper care and treatment, resulting from the ignorance and imprudence of those having charge of the sick.

9.* Those given in answer "5".

10. Better sanitary conditions.

11. Scarlet fever, 67; typhoid fever, 9; cerebro-spinal meningitis, 2; whooping-cough, many cases.

12. Small-pox, cholera, and measles.

13. The answers given are from records of my own practice and what information could be gathered by observation, and otherwise, in the practice of others.

13.† January: Scarlet fever, pneumonia, bronchitis, rheumatism.

February: Pneumonia and catarrhal diseases, scarlet fever, rheumatism.

March: Pneumonia, bronchitis, scarlet fever.

April: Catarrhal diseases, pneumonia, intermittent fever, scarlet fever.

May: Intermittent fever.

June: Intermittent fever.

July: Intermittent fever, typhoid fever.

August: Intermittent fever, typhoid fever, scarlet fever, whooping-cough.

September: Intermittent fever, remittent fever, diarrhoea, dysentery.

October: remittent fever, intermittent fever, pneumonia and catarrhal diseases.

November: Intermittent fever, pneumonia.

December: Intermittent fever, whooping-cough, pneumonia, bronchitis.

14. Most of the scarlet fever cases occurred in the first four months of the year. In the months of May, June, and July no cases occurred. In the remaining months, there were a few cases in localities where the disease had prevailed before.

15. Unusually healthy at the present time, June 19, 1877.

16. No.

17. None that I know of.

18. There was not more than a half a crop of potatoes; cause, "bugs" and drouth. They were not much affected with rot, but from the wet weather in the Fall they were "watery."

19. From having been winter-killed, and injured by insects and rust, wheat was a short crop. What there was left was of good quality, but somewhat shrunken.

20. Not more than common.

21. It is the custom here with the farmers to thresh their wheat as soon as possible after harvesting.

22. No.

23. Hay cut early was injured by rains. Late made hay was secured in good condition, and was free from mildew or mould.

24, 25, 26, 27, 28. I kept no record.

29. Of the nine cases of typhoid fever which occurred, but one or two seemed to have any traceable cause. One of these was at the residence of Prof. C. Tracy, member of the city board of health, for the fourth ward. His son Milton, ten years of age, was taken sick with typhoid fever July 24. His disease ran a regular and well defined course, with the usual characteristic symptoms of typhoid fever, although it was a mild case. The house is new, with large rooms and high ceilings, well ventilated, and clean. The privy is a part of the house, at the west end, and opens into the woodhouse. It is made without a vault and is so arranged that the feces are caught in a movable box, which is put in place from the outside. When it is full, the contents are buried in the garden, in the rear of the house. The intention of this arrangement was cleanness and pure air; but the result was that all the urine escaped from the box, while the west winds carried the gases from decomposing urine and fresh feces directly into the house. The son Milton often used the woodhouse as a playhouse and work-shop.

Three of the cases occurred at the residence of R. B. Pratt, near the Odd Fellows' Institute, in the months of June and July. There was nothing about the premises or neighborhood to which the cause of the disease could be attributed. The well was open and about twenty feet deep. The water entered by a small stream, about ten feet from the top, and disappeared at the bottom, where the water was constantly about three feet deep. The water was clear and wholesome, but was not examined by any other test for impurity.

* The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

† Diseases arranged in order of prevalence; the disease of which there were the most cases, first.

Two other cases occurred at a house on Turner street, occupied by a family by the name of Curtis. A child of D. D. White, who lived in this house a short time before, also had a disease which I believe to have been typhoid fever. Two of these three cases died. In the Fall of the year 1873, a family of six persons, by the name of Grammel, who occupied this house, were all sick. Two of the cases were well marked typhoid fever. Several examinations of the premises have failed to reveal the cause of the disease in these cases.

North Lansing, Ingham Co., June 19, 1877.

O. MARSHALL.

REPLIES BY A. W. NICHOLSON, M. D., OF OTISVILLE, MICH.

To the Secretary of the State Board of Health:

The following replies to Circular 15, are respectfully submitted:

1. With the exception of the prevalence of scarlatina, the general sickness in this locality has been about the same as the average for the three preceding years; yet, while some sections have been favored with unusual immunity from sickness, in another an increased amount occurred.

2. About the same.

3. The most deaths occurred from scarlatina, and diarrhœa of children.

4. As mentioned in the reply to question No. 1, in one section in this locality unusual sickness prevailed. This was confined to a radius of country about one mile in extent, and occupied by mills for the manufacture of pine lumber. Estimated population, 150. The habitations are entirely of a temporary nature, built of rough boards, and are questionable protections in inclement weather. The contiguous territory is mostly pine forest. A pond for the reception of logs adjoins the mills, and large quantities of decaying vegetable debris surround the premises. In one habitation, where the most serious illness appeared, the floor consisted of movable boards, beneath which stagnant water stood two feet in depth. One of its inmates died of colliquative diarrhœa, and four others, after removal, slowly recovered from fevers of a typhus type. I have, in one day, prescribed to more than one-sixth of this population. The sickness mostly consisted of intermittent and typho-malarial fevers and diarrhœas. The preceding data seem to lead to a definition of the unusual prevalence of disease within the mentioned limits.

5. In other sections than the one mentioned in answer "4", intermittent, remittent, and other forms of fever.

6. Perhaps to the increased amount of drainage.

7. From no disease.

8. —.

9. Scarlatina.

10. To sanitary measures and to the general mildness of the disease.

11. Scarlatina, about 60 cases; typhoid fever, 4 cases; whooping-cough, about 20 cases; measles, about 10 cases; diphtheria, 2 cases.

12. Small-pox, cholera, cerebro-spinal meningitis.

13. January: Scarlatina, bronchitis, pneumonia, diphtheria, tonsilitis.

February: Scarlatina, pneumonia, bronchitis.

March: Scarlatina, bronchitis, pneumonia.

April: Scarlatina, intermittent fever, erysipelas.

May: Intermittent fever.

June: Whooping-cough, intermittent fever.

July: Scarlatina, remittent fever, intermittent fever.

August: Scarlatina, intermittent fever, remittent fever.

September: Intermittent fever, typho-malarial fever, typhoid fever, diarrhœa, cholera infantum.

October: Intermittent fever, pulmonary consumption.

November: Typho-malarial fever, intermittent fever, erysipelas.

December: Bronchitis, rheumatism.

14. Scarlatina in January, February, and March.

15. Neuralgia, bronchitis, and intermittent fever.

16, 17. No disease.

18. Slight amount of rust in wheat.

19. Generally fair; wheat some shrunk.

20. Not noticeably.

21. It was.

22. No complaint.
23. Usually well secured.
24. Am unable to answer definitely.
25. Unable to answer.
26. Unusually dry in the months of July, August, and September.
27. Wells, in this vicinity, bored to the depth of about eighty feet, bring water to within eleven feet of the surface of the ground. Wells from ten to fifteen feet in depth were dry during the months of August, September, and October. Cannot answer more definitely.
28. Unusually low during the months of July, August, and September, also in November.
29. Perhaps sufficiently answered in No. 4. No other cases to specify unless those from the contagious influence of scarlatina.

Very respectfully,

Otisville, Genesee Co., Mich., April 20, 1877.

A. W. NICHOLSON, M. D.

REPLIES BY C. V. BEEBE, M. D., OF OVID, MICH.

Secretary of State Board of Health:

DEAR SIR:—You will please find enclosed answers to Circular No. 15, for Ovid, Clinton Co., and vicinity. As I have been a correspondent for only about two months, it will be more difficult for me to arrive at definite conclusions than it would otherwise have been. But I will endeavor to come approximately near to correct answers.*

1. About the same as the average of last year.
2. Increased about 25 per cent over last year.
3. Chronic diseases in very old people.
4. I cannot say.
- 5, 6. I do not know.
7. A species of throat disease, probably membranous croup. I did not lose any cases of this kind myself, consequently I cannot answer definitely.
8. I cannot.
9. I do not know.
10. —.
11. No cases of small-pox. A few of scarlatina gravior (probably 20), mostly fatal, last Spring in the vicinity of Mungerville, 5 miles east of Ovid. Quite a large number of typhoid cases, at least 50. I cannot give exact numbers for any of the above.
12. Small-pox, Asiatic cholera.
13. I cannot.
14. Scarlatina, March and April; exact dates I cannot give.
15. Influenza.
16. There is none.
17. Epizootic, not very extensive or fatal.
18. The wheat crop was badly injured by rust, and, in the opinion of some, by the extreme wet and hot weather in Spring, causing a sort of a blight.
19. Wheat, shrunk; oats, light; buckwheat and corn, good quality.
20. I do not know.
21. Yes.
22. I do not know.
23. I think less.
24. I cannot.
25. Quite wet from January to June, and dry from June to September; Sept. and Oct., moderately dry. Oct. to Jan., 1877, rather dry.
26. I do not remember.
27. Usually, from 12 to 14 feet; it would [not] vary over 2 feet at any time.
28. April.
29. I do not know of any other than the shape the seasons assumed, or changes in the weather. I could not suggest any methods for the prevention of diseases, better than a strict attention to hygiene and diet.

Very respectfully,

Ovid, Clinton Co., Mich., Jan. 1, 1877.

C. V. BEEBE, M. D.

* The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

REPLIES BY G. E. CORBIN, M. D., OF ST. JOHNS, MICH.

DEAR SIR:—I will attempt a reply to your circular relative to the diseases of this locality during the year 1876.

1. Decidedly less than during the year 1875.
2. Less than during the year 1875, and less than the average for previous years.
3. Not any.
5. Scarlet fever and measles prevailed seriously during the year 1875, and scarcely prevailed at all during the year 1876.
6. I cannot state.
7. Not any of which I am aware.
9. Diseases dependent upon malarial influences are rapidly subsiding in this locality; hence the mortality from such diseases is constantly growing less.
11. A few sporadic cases of diphtheria are all that I can mention under this head.
13. I cannot.
15. Catarrh, chicken-pox, and a little pneumonia.
16. No.
17. I am not aware of any.
18. I cannot state. I have heard of none.
19. Good, I think.
21. Yes.
22. Neither.
23. In as good condition as usual.
24. I cannot do so.
25. I cannot give it by months, as I kept no record; but I distinctly remember that the fore part of the season was excessively wet, and the latter part excessively dry.
26. Unusually moist, during May and June; unusually dry during August and September, and, in fact, during the entire Autumn.
27. The village of St. Johns is built mostly upon a ridge, or elevation, extending from north-east to south-west. In digging our wells, we pass through solid clay to the depth of ten or twenty feet, when quicksand of an unknown depth is reached. In this quicksand is found clear, pure, cool, "hard water". On the south side of the ridge the water is reached at a depth of twenty to thirty-five feet. On the north side of the ridge, the depth of ground above ground water, is five or ten feet less. The height of the water in this quicksand is not sensibly affected by dry spells of short duration. When it so happens that an entire year records much less than the usual rainfall, and especially when two such years occur in succession, the water in our wells recedes several inches,—ten or fifteen, possibly.
28. Low, late in Autumn.

Very truly,

St. Johns, Clinton Co., Mich, March, 1877.

G. E. CORBIN.

BAY AND EASTERN DIVISION.*

REPLIES BY W. R. MARSH, M. D., OF BAY CITY.

DEAR SIR:—Circular 15 is before me; but as I did not keep a record of 1876, I cannot give you figures or statements of sufficient correctness to be of much value. Such as I have I give you.

- 1, 2. The same as the average.
11. No small-pox, no cholera, or typhoid fever; a few cases of scarlet fever, typho-malarial fever, measles, whooping-cough, and cerebro-spinal meningitis, with here and there occasional cases of diphtheria. We had no epidemic of any of the above-named diseases. The cases that did present themselves for treatment were light, with small percentage of deaths.
17. Nothing noticed among animals.
18. Crops good with no decay or disease.
19. Good, except corn, which was not quite matured before the cold weather caused it prematurely to cease growing.
21. It was.
22. Less liable to "bank". The wheat was dry, but had a shrunken or small berry.

* For counties included in each Division, see Exhibit 1, page 171.

29. One of the most prominent causes, and one that prevails and gives some of the diseases their character, is *miasm*, with perversions of liver secretions, incident to undrained localities when freshly improved, and exposed to sunlight and climatic changes. Good drainage and *early Spring* cleaning up, so that the heavy rains of Spring may wash away the waste of Autumn and Winter, would make our city a healthy locality.

Our city is on hard clay with a rich surface of soil, from one to five feet in depth; so that drainage is much more necessary than on a porous subsoil.

Respectfully yours,

Bay City, Bay Co., Mich., October 23, 1877.

WILLIAM R. MARSH.

REPLIES BY NELSON H. CLAFLIN, M. D., OF EAST SAGINAW.

- 1.* Less, by one-eighth.
2. About the same.
3. None.
4. —.
5. Malarial fevers, dysentery.
6. Filling and draining the low portions of the city.
7. None.
8. —.
9. Dysentery, scarlatina, diphtheria.
10. The diseases were of a milder form than usual.
11. Do not know; as nearly as I can judge, there were of scarlet fever, 12 to 20; measles, 5 to 15; whooping-cough, 200; diphtheria, 15 to 20.
12. Of small-pox, cholera, typhoid fever, and cerebro-spinal meningitis, there was no case.
13. I cannot.
14. There has been none.
15. Malarial fevers, only.
16. No.
- 17, 18. None.
- 19, 20. I think all were well developed and not diseased.
21. Yes.
- 22, 23. —.
- 24, 25. I cannot.
26. In July, it was dry.
27. I cannot.
28. It was at no time unusually high or low.
29. —.

The above is the best I can do *now* in answer to Circular 15.

Yours truly,

East Saginaw, Saginaw Co., Mich., Sept. 16, 1877. NELSON H. CLAFLIN, M. D.

REPLIES BY B. B. ROSS, M. D., OF EAST SAGINAW, MICH.

Secretary State Board of Health:

SIR:—Herewith, as your correspondent at this point, I send report of diseases, etc., in response to questions contained in circular No. 15. Territory covered by report is Saginaw county and portions of Tuscola and Midland counties.*

1. Greater than in 1874 and 1875; less than in years preceding these.
2. About the average of the two preceding years.
3. None.
4. No diseases more prevalent than usual.
5. All zymotics, especially.
6. Climatic causes generally, and in this city particularly, improved drainage and better hygiene.
7. From none.
8. —.
9. From all.
10. See "6".
11. Small-pox, none; cholera, none; scarlet fever, 100; typhoid, 25; measles and

* The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

whooping-cough in large numbers during first half of year. I cannot give any estimate of numbers; cerebro-spinal meningitis and diphtheria, only a few cases, not epidemic.

12. See "11."

13. Can't.

14. None have occurred.

15. Catarrhal and malarial fevers.

16. No.

17. None.

18. Am not aware of any.

19. First-class.

20. No.

21. Yes.

22. No.

23. Hay crop in good condition, but light.

24 to 29. I cannot answer these.

Yours,

East Saginaw, Saginaw Co., Mich., Jan. 2, 1877.

BENJAMIN B. ROSS.

REPLIES BY A. NASH, M. D., OF LAPEER, MICH.

Answers to Circular No. 15.

1. It was greater than in former years.

2. The proportion of deaths was greater.

3. Dysentery, gastric fever, intermittent fever, cholera infantum.

4. Defective sewerage, and the total absence of all police or sanitary regulations.

5. None.

7. Dysentery, and infirmities incident to old age.

8. The general prevalence of malaria.

9. Pneumonia, scarlatina, croup, and diarrhœa.

10. Any cause I might assign would be merely conjectural.

11. No small-pox or cholera. Scarlet fever was not epidemic; I think 10 cases would comprise the entire number in this vicinity; no typhoid fever or measles; whooping-cough has prevailed the entire year; no cases of cerebro-spinal meningitis; diphtheria has also been mild.

12. Small-pox, cholera, typhoid fever, cerebro-spinal meningitis.

13. I have not the data to make a reliable statement.

14. Dysentery commenced here about the middle of July.

15. Scarlatina, influenza, erysipelas, pneumonia.

16. No.

17. None to my knowledge.

18. I have heard of nothing except rust of wheat.

19. Condition good.

20. I think not.

21. Yes.

22. Nothing unusual, in this particular.

23. I cannot say. Hay at present is in good condition.

24. I am unable to state, but would refer you to Dr. Caulkins of Thornville, for reliable facts under this head.

25. I cannot give information on this point.

26. The soil was moist, most of the season.

27. I think the ground water lies from 20 to 50 feet below the surface. The depth of water in most of the wells varies from 2 to 5 feet.

28. I cannot state.

29. I am becoming more and more convinced that the use of impure water is the most fruitful source of disease we have to contend with. I find, by examining the water from a large number of wells in this vicinity, with a microscope, that it is loaded with organic matter, and differs but little from the water from our ponds and lakes. I have frequently found water from a well, situated 10 to 15, and even 20 rods from a stagnant pond or lake, emitting the same odor, and having the same taste as the water from the adjacent pond. The public need some practical hints in reference to the proper construction of wells.* This is particularly true of our villages, many of which are entirely destitute of police regulations, and all sanitary measures; they are, as a general thing, much worse off than our most populous cities, which have some

* [For hints of this kind, see Report on the "Water-Supply of Michigan," by Prof. R. C. Kedzie, Fourth Annual Report of this Board, pp., 109-119.—H. B. B., Sec'y.]

common water-supply. I think it could easily be demonstrated to any intelligent community that a large proportion of our villages of 2,000 inhabitants and upwards could be more economically and healthfully supplied with water from a common source, through water-works or artesian wells, than by family wells constructed without any reference to the nature of soil, the direction of underlying strata, or the nearness of stagnant pools. I am satisfied that in many localities it would be impossible to dig a well without obtaining more or less impurities with the water, perhaps from a neighboring lake or marsh.

Respectfully,

Lapeer, Lapeer Co., Mich., Feb. 5, 1877.

A. NASH.

REPLIES BY A. M. OLDFIELD, M. D., OF LEXINGTON, MICH.

*Secretary of State Board of Health: **

1. I could not say, with any certainty of accuracy; probably about the average.
2. Average, as nearly as can be ascertained.
11. A good many cases of whooping-cough; as to the number, I could not say; I know of but two cases of diphtheria.
12. Small-pox, cholera, scarlet fever.
15. Inflammatory diarrhea.
16. Inflammatory diarrhea, children.
18. Rust on wheat.
19. Shrunken.
20. Wheat.
21. Yes.
26. Dry in July.

Lexington, Lapeer Co., Mich., Aug., 1877.

A. M. OLDFIELD M. D.

REPLIES BY M. NORTHUP, M. D., OF PORT HURON, MICH.

Secretary State Board of Health:

SIR:—The following is my reply to the Circular relative to prevailing diseases of 1876:*

1. Less, 15 per cent.
2. Less, 20 per cent.
- 3, 4. None.
5. Cholera infantum and diarrhoea.
6. Better and more abundant water-supply.
- 7, 8. None.
9. Cholera infantum and diarrhoea.
10. Better and more abundant water-supply.
11. 200 cases (opinion), besides intermittents, and remittents, which are endemic.
12. Small-pox, cholera, cerebro-spinal meningitis.
13. Cannot give it.
14. None.
15. Remittents, intermittents.
16. None.
17. Do not know of any.
18. Potatoes were rotting some.
19. Good.
20. No.
21. Yes.
- 22, 23. No.
24. Refer you to Government Signal Service report.
- 25, 26. Cannot give it.
27. Six feet.
28. Unknown.
29. Cannot give any at present.

Yours, etc.

Port Huron, St. Clair Co., Mich., Oct. 22, 1877.

M. NORTHUP, M. D.

* The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

REPLIES BY J. M. LOOP, M. D., OF PORT SANILAC, MICH.

Secretary State Board of Health :

DEAR SIR:—The following answers apply mostly to the surrounding country, not to the village.

1. About the same as in previous years.
2. About the same.
3. Croup and diphtheria.
4. I cannot give the cause.
- 5, 6. —.
7. Consumption and croup.
- 8, 9, 10, 11. —.
12. Small-pox, cholera, measles, whooping-cough, and cerebro-spinal meningitis.
13. My mind not being specially called to the subject, I am not prepared to answer to an earlier date than August.
- August: Diarrhœa, intermittent fever, bronchitis, cholera morbus, cholera infantum, inflammatory rheumatism.
- September: Diarrhœa, influenza, intermittent fever, croup, rheumatism, dysentery erysipelas.
- October: Diarrhœa, intermittent fever, influenza, croup, erysipelas, scarlatina.
- November: Bronchitis, scarlatina, intermittent fever, rheumatism, pneumonia.
- December: Diphtheria, scarlatina, croup, and sore throat of a diphtheric character.
14. —.
- 15, 16. Not any.
17. Some cases of horse-distemper in Winter.
18. Smut in cereals; wheat, shrunk; potatoes, wet and pasty.
19. Dry and in good condition.
20. All cereals were somewhat affected with smut.
21. I believe it was.
22. I have not heard any complaint.
23. Good, and well secured.
24. —.
25. April and May, unusually wet, and Summer dry. The seasons have been pretty uniform, wet Spring and dry Summer months.
26. The earth has been, as the seasons would indicate, wet in the early part of the season, and dry in the latter part.
- 27, 28. —.
29. Nothing to communicate that would be of interest.

Very respectfully,

Port Sanilac, Sanilac Co., Mich., May 21, 1877.

J. M. LOOP.

REPLIES BY JOHN S. CAULKINS, M. D., OF THORNVILLE, MICH.

To the Secretary of the State Board of Health :

My answers to the Circular relative to prevailing diseases, apply to the township of Dryden and parts of the contiguous townships of Lapeer, Attica, and Metamora.

1. Less. I think I am warranted in saying that, with the exception of some localities (principally Lapeer City), where epidemic dysentery prevailed, 1876 was one of the healthiest years in the history of Lapeer county.

2. Less than the average, by 15 per cent.

3. During the Winter and Spring there were a few cases of scarlet fever; during the months of August and September, some dysentery; and later in the year, quite an epidemic of whooping-cough, with one fatal case. For nearly the entire year there has been a mild type of diphtheria.

4. The village of Thornville is situated on a millpond. There was a coincidence between the temporary draining of the pond for repairs and the breaking out of dysentery, during the latter part of August. The smell from the pond was bad, and after nightfall could be perceived very distinctly a mile away. Simultaneous with the dysentery, there was an outbreak of malarious fevers. No doubt the stink of the pond caused the last-named disease; whether it caused the other, is an open question, but it is safe to say that if it did not cause, it might aggravate.

5.* Malarious diseases and all others, except those mentioned above; and in Dec., an epidemic of influenza.

6. To improved conditions, especially with regard to drainage and residences.

7, 8. None.

9. From most. Some cases of scarlet fever were severe, but none fatal. Whooping-cough might be classed as average.

10. Perhaps, in the case of scarlet fever, to milder type,—an unsatisfactory answer, equivalent to an admission of ignorance. It is difficult, on account of want of knowledge concerning the whole subject, to theorize on the conditions that modify this disease. In all other diseases, I attribute the lessened mortality to their lessened prevalence; perhaps the mild Winter has to do with that. What has been said above about scarlet fever will apply to diphtheria.

11. Scarlet fever, twenty-five cases; typhoid fever, four; whooping-cough, probably fifty; dysentery, ten; for influenza, a hundred would be a low estimate.

12. Small-pox, cholera, measles, cerebro-spinal meningitis.

13. Jan., Feb., March, April: Pneumonia, scarlet fever, rheumatism, and diphtheria.

May, June, and July: Scarlet fever and bilious diseases.

August and September: Dysentery, bilious diseases, and whooping-cough.

Oct., and Nov.: Typhoid fever, bilious diseases, and whooping-cough.

December: Typhoid fever, pneumonia, bronchitis, and influenza. There have been mild cases of diphtheria, scattering through the whole year.

14. The influenza commencing Dec. 15th and prevailing at this date (Jan. 5, 1877), is rather unusual.

15. Besides the influenza, there is not much. The little is divided between pneumonia, bronchitis, typhoid fever, and rheumatism.

16. None unusually fatal.

17. Have ascertained by enquiry the following facts: Horses, pigs, and sheep are quite as healthy as usual; but among the horned stock there have been some sudden deaths, which are believed by some to be caused by eating the smut from corn. Corn this year is unusually smutty. Ira Reynolds of Lapeer, who lost four head of young fat cattle, believes his cattle died from eating the smut of corn. He turned them, in a healthy condition, into the corn stubble, an 8-acre field, where the smut had been left on the ground. There was not enough sound corn to kill them at the rate they would get it. They were not found baked in the manure, on opening. Their symptoms were different from death by repletion. Their symptoms were jerking and trembling, frothing and blindness. When made to get up, they would walk, jerking, against any object, as a fence or stump.

It is not of course, proved that the smut killed the cattle, but it looks very probable. There is a great skepticism, in the minds of the farmers, with regard to smut being hurtful. Out of the many that I have consulted, nine-tenths, at least, consider it perfectly innocent. It is certain that it is not at all distasteful to the cattle.

There has been, and is, something wrong with the barn-door fowls,—quite a mortality among them, besides the annual one that the holidays cause. One fancier claims that he has lost 400.

18. Wheat was affected with rust; corn (as stated above), and early oats, by smut; late oats, by rust. Not much rye raised about here. Buckwheat was mostly killed by frost. Potatoes were hurt by bugs and dry weather. Hops were almost ruined by worms, apparently the same as the currant worm.

19. Wheat, a good deal shrunk, in many cases; oats, very good, but light in weight; buckwheat, beans, barley, and corn, good.

20. Answered in "18". The condition of the corn crop needs farther remark. It was the smuttiest I ever saw, and I have the expression of many, say 20 prominent farmers, on the subject. They are unanimous in their verdict that the corn is about three times more smutty than usual.

21. Yes.

22. They say that it is as mobile as usual.

23. The early cut, more; the late cut, less.

* The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

24. *Summary, for the year 1876, of meteorological conditions at Thornville, Michigan:*

YEAR AND MONTHS, 1876.	TEMPERATURE.						Total Precipi- tation,— inches.	Prevailing Wind.	REMARKS.
	High- est.	Low- est.	Range.	Aver- age.	Date of Highest.	Date of Lowest.			
Year.....	92°	-7°	99°	45.67°	2 P. M., July 7.	March 19th.	30 $\frac{3}{4}$	Westerly.	Last hard frost of Spring, April 30; first of Fall, Oct. 6.
Jan.....	60°	10°	50°	31.39°	2 P. M., 1st.	7 A. M., 10th and 20th.	1 $\frac{1}{2}$	S. W. and W.	Warm, dry, and pleasant.
Feb.....	52°	-2°	54°	23.55°	11th.	-----	2 $\frac{1}{4}$	S. W. and N. W.	Much like January, but colder.
Mar.....	60°	-7°	67°	28.52°	6th.	19th.	3.53	S. W., S. E.	More like a Winter month than Jan.; great range of temp.; good sleighting, last half.
April....	70°	22°	48°	41.58°	2 P. M., 27th.	7 A. M., 1st.	1 $\frac{1}{2}$	W., S. W., E.	A dry month; few high winds.
May.....	85°	26°	59°	52.52°	2 P. M., 20th.	7 A. M., 1st.	6	E., S. W.	A wet month; fresh winds, muddy roads.
June.....	91°	50°	41°	67.77°	2 P. M., 12th.	6th, 7th, 19th, 21st.	3	S. W.	A hot month; much cloudy weather.
July.....	92°	55°	37°	67.42°	2 P. M., 7th.	25th.	2 $\frac{3}{4}$	S. W.	A hot month; little wind, many calm days.
Aug.....	89°	47°	42°	71.77°	3 P. M., 4th.	Before sun- rise, 21st.	4.17	S. W.	Not so hot as July; less wind; wind gentle for whole month; many calm days; slight frost on night of 20th.
Sept.....	73°	40°	33°	54.57°	3 P. M., 19th.	Before sun- rise, 27th and 30th.	1 $\frac{1}{2}$	-----	A dry, cool month; much cloudy weather. 13 days of easterly wind, and so little precipita- tion, an unusual result.
Oct.....	63°	27°	36°	44.32°	2 P. M., 21st.	9th, 11th, 15th.	$\frac{3}{4}$	N. W., W.	An almost rainless month; more than half cloudy; severe frosts.
Nov.....	65°	14°	51°	38.8°	2 P. M., 1st.	Before sun- rise, 30th.	$\frac{1}{2}$	-----	Pleasant month, grow- ing wintry toward the last.
Dec.....	40°	-9°	49°	22.5°	2 P. M., 13th.	7 A. M., 11th	2	N. W.	Steady winter weather, thawing only one day; good sleighing the lat- ter half.

25. Soil moisture was deficient during the entire year, except the months of May and June.

26. The soil was unusually moist during the first half of May, to that degree that crops could not be sown; and in some cases land already fitted had to be replowed. It was unusually dry the rest of the year, except a short time in August. These exceptions apply only to the surface soil. The subsoil has been abnormally dry during the entire year.

27. I cannot give measurements of the depth of earth above the ground water, but can state that its level became constantly lower from the beginning of the year till July, at which time there was a temporary rise. Since September 1 it has constantly grown less again, and at present it is unprecedentedly low. All low lands, swamps, and cat-holes are entirely dry, and many wells have entirely failed.

28. Never unusually high.

Very respectfully.

Thornville, Lapeer Co., Mich., Jan., 1877.

JOHN S. CAULKINS.

SOUTH-WESTERN DIVISION OF THE STATE.*

REPLIES BY H. S. LAY, M. D., OF ALLEGAN, MICH.

Secretary of the State Board of Health:

DEAR SIR:—Herewith I send answers to questions in Circular No. 15: †

1. A decrease of 20 per cent.
2. Probably 10 per cent less.
3. No diseases.
5. Malarial fevers, diphtheria, and cerebro-spinal meningitis.
6. Better drainage, the drying up of low and swampy lands, etc.
7. Scarlet fever, in a few families.
8. A lack of sanitary conditions.
11. Do not know, but my opinion is about 100.
12. Small-pox, cholera, and cerebro-spinal meningitis.
13. I cannot do so, for want of statistics.
15. Malarial fevers, to a limited extent.
16. No.
17. Epizootic among horses, to a slight extent.
18. None, to any extent.
19. Generally good.
20. No.
21. Yes.
22. No.
23. Rather less.
24. I am unable to do so.
25. I cannot do it.
26. At no time.
27. I cannot do it with any degree of accuracy.
28. At no time.
29. I cannot at present; I may at some future time.

This report is made to cover Allegan township and village, in the county of Allegan.
Allegan, Allegan Co., Mich., October, 1877.

H. S. LAY, M. D.

REPLIES BY HENRY F. THOMAS, M. D., OF ALLEGAN, MICH.

Secretary State Board of Health:

SIR:—In reply to Circular No. 15, I submit the following: †

1. About the same as during previous years.
2. Greater, 10 per cent.
3. About the same.
4. None.
5. Less intermittent and remittent fevers.
6. To increased drainage, which has been quite great in this township and the surrounding country.
7. We have had, during the year 1876, a greater number of deaths from old age, which I think is the cause of the increased mortality.
8. —
9. There has been less mortality from scarlet fever.
10. For the reason that the people exercise more care as to the hygienic conditions.
11. Small-pox, 0; cholera, 0; scarlet fever, 25 cases; typhoid fever, 2 cases; measles, 40 cases; whooping-cough, 25; cerebro-spinal meningitis, 6 cases; diphtheria, 0.
12. Small-pox, cholera, and diphtheria.
13. I cannot.
- 14, 15, 16. —
17. No epidemic.
18. No complaint.
19. Good condition.
20. No.
21. Yes.
22. About the same.
23. Good condition.

* For counties included in each division, see Exhibit 1, page 171.

† The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

24. Meteorological conditions at Allegan, Mich., for the year 1876. Lat., 42° 31' 43.07''; Long., 8° 50' 29.18'', west of Washington.

MONTHS, 1876.	THERMOMETER.			Prevailing Winds.	SNOW AND RAIN.		Days all Clear.	Days all Cloudy.	OZONE.		REMARKS.
	Mean.	Highest.	Lowest.		Inches of Snow.	Inches of Rain and Melted Snow.			Range.	Average.	
Jan.....	33½°	76°	6°	S. W. & W.	3.0	2.65	0	16	1 to 8	4	Saturday night, July 8, a large meteor passed over this village from S. E. to N. W., leaving behind it a train of luminous smoke. For several seconds the earth and sky were lit with a pale greenish light, as bright as that made by a full moon.
Feb.....	26°	62°	1°	W. & N. W.	7.0	3.50	2	9	2 to 9	4	
March.....	32½°	67°	0°	S. & S. E.	4.0	2.40	4	10	1 to 7	3	
April.....	44½°	71°	8°	S. W.	-----	2.40	1	2	1 to 8	3	
May.....	60½°	88°	21°	East.	-----	4.05	2	4	1 to 6	3	
June.....	68½°	91°	36°	S. W.	-----	2.70	1	3	1 to 6	3	
July.....	73°	99°	43°	S. W. & S. E.	-----	1.55	2	0	0 to 4	1¼	
August.....	76½°	96°	41°	S. E. & S. W.	-----	2.44	1	1	1 to 2	2	
Sept.....	55½°	88°	26°	S. W. & W.	-----	1.85	2	7	1 to 2	1½	
Oct.....	50°	70°	17°	Westerly.	-----	2.05	1	1	1 to 3	1	
Nov.....	40½°	76°	10°	E. & S. E.	4.0	8.20	1	9	1 to 4	2½	
Dec.....	12½°	47°	0	S. E. & S.	11.0	1.10	0	13	1 to 6	3	
Year....	48¼°	99°	0	S. E. & S. W.	22.0	34.89	17	75	1 to 4	2¼	

25. See table.

26. I cannot give a statement for 1875.

27, 28. Cannot give facts.

29. I would report that during the month of December, 1875, we had a number of deaths from diphtheria; and that my observations as to ozone showed a large average for the month; while this year, 1876, the average has been only three, with an absence of the disease.

Respectfully,

Allegan, Allegan Co., Mich., June 28, 1877.

HENRY F. THOMAS.

REPLIES BY THOS. H. BRIGGS, M. D., OF MATTAWAN, MICH.

DEAR DOCTOR:—In relation to Circular No. 15:

1. Less, by 25 per cent.

2. Less, by 20 per cent.

5. Malarial diseases and their complications.

6. Dry weather.

11. Measles, 40; whooping-cough, 50; diphtheria, 5.

12. Small-pox, cholera, scarlet fever, typhoid fever, cerebro-spinal meningitis.

15. Rheumatism.

17, 18. None.

19. Good.

20. No.

21. Yes.

22, 23. No.

26. From Jan., 1875, to Jan., 1876, dry.

27. Wells are an average of about seventy feet in depth; no streams.

28. Unusually low from March till November.

29. I cannot say anything about this.

Truly yours,

Mattawan, Van Buren Co., Mich., May 14, 1877.

THOS. H. BRIGGS.

REPLIES BY MILTON CHASE, M. D., OF OTSEGO, MICH.

Secretary State Board of Health:

SIR:—The following is my reply to Circular No. 15, relative to prevailing diseases, 1876. Locality, village of Otsego and the surrounding country, for a radius of about six miles.*

1. Less than the average; diminished about 15 per cent.
2. Less than the average, by about ten per cent.
- 3, 4. None.
5. All, unless cerebro-spinal meningitis, which some years is not present at all.
6. Hard times. This makes people more temperate, virtuous, and less venturesome and reckless. There has been no epidemic or endemic disease among us; why, I do not know.
7. None.
8. No occasion to assign a cause.
9. Remittent, continued, and eruptive fevers, diarrhœa, and dysentery.
10. To lessened amount of the diseases mentioned in answer "9."
11. Not much of any of them; I cannot be definite. I should say about 20 cases of cerebro-spinal meningitis and fifty cases of measles and whooping-cough.
12. Small-pox, cholera, scarlet fever, typhoid fever, measles, diphtheria.
13. I cannot do it.
14. Cerebro-spinal meningitis in April and October, a few cases.
- 15, 16, 17. None.
18. A little more smut in wheat; buckwheat, light berry and small yield, caused by dry weather when filling. Potatoes small and small crop,—bugs and dry weather when setting, the probable cause.
19. Better than usual.
20. None, except smut in wheat.
21. Yes.
22. No.
23. Clover hay that was cut in June, more than usual.
24. I cannot do it.
25. First half of the year more than usually wet; last half, about an average.
26. Answered above.
- 27, 28. No knowledge about this.
29. Nothing under this head.

I think that our people are not prepared to submit to quarantine of scarlet fever, and they ought to be educated to this. I am quite sure that people about here are too negligent about privy-vaults, and too careless about the contamination of wells.

Very respectfully yours,

Otsego, Allegan Co., Mich., Jan. 17, 1877.

DR. M. CHASE.

SOUTHERN CENTRAL DIVISION OF THE STATE.†

REPLIES BY ROBERT STEPHENSON, M. D., OF ADRIAN, MICH.

Secretary of State Board of Health:

DEAR DOCTOR:—The following I send in answer to Circular 15, Prevailing Diseases, 1876:*

- 1, 2. About the same.
3. There have been no causes of death *more* than usually prevalent.
4. —.
5. There have been no causes of death *less* than usually prevalent.
6. —.
7. None.
8. —.
9. None less than usual.
10. —.
11. No cases of small-pox in city, but all around us; no cholera; scarlet fever, about 10 cases, as far as I can ascertain; typhoid fever, a few; measles, quite a number, how many I do not know, but should judge as many as an hundred or more; whooping-

* The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

† For counties included in each division, see Exhibit 1, page 171.

cough, a few; cerebro-spinal meningitis, none that I know of or can find out; diphtheria, quite a number.

12. Small-pox.

13. 14. —.

15. Dysentery, diarrhoea, intermittent and remittent fever, also a few cases of typhoid.

16. No.

17, 18. None.

19. Good.

20. No.

21. Yes.

22. No.

23. Yes.

24, 25. —.

26. August and September, dry.

27, 28, 29. —.

Yours respectfully,

Adrian, Lenawee Co., Mich., Sept. 27, 1877.

ROBERT STEPHENSON.

REPLIES BY JOHN P. STODDARD, M. D., OF ALBION, MICH.

To the State Board of Health:

GENTLEMEN:—I have the honor to reply as follows to Circular No. 15, Relative to Prevailing Diseases for 1876.

I answer for the village of Albion, Mich., and surrounding country within a radius of five or six miles,—containing a population, probably, of about 3,600. I regret to have to say that I am unable to be as exact in many of my answers as I could wish, and that far too often a mere opinion must take the place of a definite statement. I trust the time may soon come when intelligent legislation will compel all physicians to keep a record of all cases of disease, accident, and death, and they be obliged by law to make a written report each month to the proper health officer for each locality. Thus we could insure greater exactness and arrive more nearly at the true state of the facts, and our answers would better advance true statistical knowledge.

1. I am quite sure that the amount of sickness in this locality, for the past year, has been less than the average for the past five years,—perhaps ten per cent less.

2. Nearly the same as the average, or slightly less.

3. No one disease or cause more prominent than another, except diphtheria. From the latter disease five persons died during the month of December.

4. Diphtheria was imported to this locality.

5. All diseases, except diphtheria and, perhaps, consumption.

6. To the better drainage of our village, and to a more equable season.

7. Diphtheria.

8. I cannot say.

9. All diseases, except diphtheria and consumption, as before mentioned.

10. To the more equable climate, and to the less prevalence of disease of all descriptions.

11. I cannot be exact, but I think there have been about forty cases of these diseases, as stated more in detail below. Of scarlet fever, there have been 2 cases; of typhoid fever, 5 cases; of measles and whooping-cough, a larger number, but I cannot say how many, as often no physician was called; of cerebro-spinal meningitis, one case; of diphtheria, 15 cases.

12. Small-pox and cholera.

13. I am not able to do so.

14. Typhoid fever, in August and September, but no deaths therefrom; diphtheria prevailed in December, from which there were five deaths, or 33 $\frac{1}{3}$ per cent of all reported cases.

15. Diphtheria, influenza, laryngitis, bronchitis, consumption, rheumatism, intermittent and remittent fevers. The prevalence in order of their mention.

16. Diphtheria only. There have been during this month (January), 8 or 9 cases, with two reported deaths.

17. I cannot say.

18. Rust on most grains, rather more than usual. Cabbages rotted very badly while standing and even before coming to maturity.

19. Very good.

20. No.

21. Yes.

22. Not so much.
23. Hay poorly cured and much moulded in the bay and stack.
- 24, 25. I cannot do so.
26. More moist than the two previous years, but not exceedingly so.
27. I can answer only approximately. Water in all wells and streams was higher, by one or two feet, than for the previous year, during months of April and May, and lowest during September.
28. About the average.
29. I have none.

Truly yours,
JOHN P. STODDARD, M. D.

Albion, Calhoun Co., Mich., Jan. 26, 1877.

REPLIES BY WILLIAM WORSFOLD, M. D., OF AUGUSTA, MICH.

Secretary of the State Board of Health:

DEAR SIR:—In answer to Circular No. 15, I take great pleasure in supplying what little information I have been able to collect during my short residence in this locality, apologizing for its fragmentary character:*

1. General sickness has not been more than one-third of what it was in 1875; compared with some years previous to that, the proportion would be rather less than one-third.

2. I have not been able to collect statistics as regards deaths, but will give the record of the sexton of the cemetery here: In 1875 there were 21 interments; in 1876, but 5 interments.

3, 4. None.

5. There has been a general diminution of all diseases, particularly zymotic diseases.

6. Along with climatic influences, general constitution of the atmosphere, I think the less prevalence of disease is partly owing to the more economical and careful manner in which people generally have had to live.

7, 8. Nothing.

9, 10. There has been less than the usual mortality from all diseases, particularly in summer complaints. The cause of this might be briefly ascribed to the general mild type of disease.

11. I have become cognizant of several cases of diphtheria, occurring in two families some five miles from here; but as they were treated by some one in Battle Creek, I cannot give particulars; they occurred in November.

15. Pneumonia, pulmonary congestion, bronchitis, tonsillitis, laryngitis.

16. The above mentioned diseases, no usual mortality attending them.

17. I can find no record, or information personally obtained, of any disease amongst animals.

18. None.

19. All grains in this locality were harvested in good condition.

20. Wheat is somewhat affected with "smut;" this is more particularly noticeable in the grain that was below average quality.

21. Yes.

22. Less liable to "bank," and it produces a rather better quality of flour than in 1875.

23. Less.

The latter part of the circular I am obliged to omit, as I have no information concerning it.

Yours very respectfully,

Augusta, Kalamazoo Co., Mich., Jan. 10, 1877.

W. WORSFOLD.

REPLIES BY HAL C. WYMAN, M. D., OF BLISSFIELD, MICH.

Secretary State Board of Health:

In reply to Circular 15, I make answers for the south-east quarter of Lenawee, and south-west quarter of Monroe county.*

1, 2. About the same as the average.

3. Membraneous croup.

4. I cannot.

5. Typhoid fever.

6. Some knowledge of sanitary science.

7. Cholera infantum and membraneous croup.

* The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

8. I cannot.
9. Typhoid fever.
10. Less frequency of the disease.
11. I cannot give the number of cases of cholera (c. infantum), even approximately.
12. Small-pox.
- 14, 15. —.
16. No.
17. Hog cholera.
18. Crops usually healthy.
19. Healthy.
20. Not unusually, say the millers.
21. Yes.
- 22, 23. No.
24. Noticed a marked falling off in the frequency of cholera infantum for two days after several thunder storms in the months of July and August.
25. Has been *wet*, excepting July, August, and September, when it was moist.
26. Spring and Fall unusually *wet*.
27. Six feet.
28. Unusually high in months of April and May.
29. A tract of country has been very sickly, is without drainage, and is flooded by water bearing the "wash" of many barnyards and several cheese factories. I am preparing a full statement of facts regarding this tract, its population, mortality, and suffering.

Blissfield, Lenawee Co., Mich., Jan. 2, 1877.

HAL C. WYMAN.

REPLIES BY E. N. PALMER, M. D., OF BROOKLYN, MICH.

Secretary State Board of Health:

DEAR SIR:—The following is respectfully submitted, and I deeply regret that I cannot make it more complete.

1. Sickness was less than the previous year; also deaths.
2. At least 10 per cent.
3. None, except malaria.
5. Pneumonia, in particular.
6. To climatic influence alone. The winter of 1874-5 was extremely cold and varied by extremes of temperature. Pneumonia became an epidemic. There was only about 2 per cent of deaths. These occurred among the very old and very young. The last year has been mild, with no great extremes of heat or cold.
- 7, 8. None.
11. Typhoid fever, 8; diphtheria, 20; whooping-cough,—almost every child under 10 years had it. The disease was of a mild character; but few died, and these from the supervision of pneumonia; scarlatina, 3; cerebro-spinal meningitis, 2.
12. Small-pox, cholera, measles.
13. January: Typhoid fever, 8; pneumonia, 5; rheumatism, 1; diphtheria, 1; erysipelas, 1.
February: Diphtheria, 2; typhoid fever, 3; pneumonia, 9; whooping-cough,—see answer "11"; rheumatism, 2; scarlatina, 2.
March: Rheumatism, 4; pneumonia, 6; scarlatina, 3; cerebro-spinal meningitis, 1; whooping-cough, 1.
April: Pneumonia, 8; scarlatina, 1; whooping-cough, 1.
May: Rheumatism, 1; pneumonia, 6; malarial fever, 2; whooping-cough, diphtheria, 1; cerebro-spinal meningitis, 1.
June: Pneumonia, 3; malarial fever, 1; typho-malarial fever, 1.
July: Erysipelas, 1; malarial fever, 6; rheumatism, 1; diphtheria, 2; dysentery, 4; pneumonia (traumatic), 1.
August: Malarial fever, 10; diphtheria, 1; dysentery, 2; diarrhoea, 5; pneumonia (traumatic), 1.
September: Pneumonia, 3; malarial fever, 27; typho-malarial fever, 2; diarrhoea, 2.
October: I was absent from home.
November: Malarial fever, 3; pneumonia, 3; erysipelas, 3; diphtheria, 5.
December: Pneumonia, 8; diphtheria, 8.
15. Pneumonia.
- 16, 17. None.
18. None, except mould.
19. All grains are in good condition, wheat being more than good.

- 20.* No.
21. Yes.
22. Less.
23. None.

24. *Meteorological Conditions in Brooklyn, Michigan, for the year 1876.*

YEAR AND MONTHS, 1876.	THERMOMETER.			Prevailing winds.	Snowy days.	Rainy days.	Clear days.	Cloudy days.
	Highest.	Lowest.	Average.					
YEAR	100°	-10°	48°†	S. W.	20	23	151	164
January	58°	12°	51°	S. W.	3	3	8	17
February	51°	-0°	29°	W. S. W.	1	3	12	12
March	55°	10°	28°	W.	5	4	10	11
April	62°	32°	46°	W. N. W.	.....	2	20	8
May	80°	40°	57°	W.	.....	4	16	11
June	92°	55°	72°	S. W.	.....	2	10	18
July	100°	60°	80°	S. W.	.....	4	20	6
August	98°	45°	75°	E. S. E.	.....	1	17	13
September	79°	43°	58°	E.	.....	3	7	20
October	65°	26°	43°	S. W.	.....	1	14	16
November	58°	20°	41°	S. W.	5	1	5	19
December	39°	-10°	14°	S. W.	6	0	12	13

† [Average of monthly averages, made in this office.—H. B. B., Sec'y.]

25. I cannot give it by months, as I have no data; but for the first half of the year the soil was very moist, while for the later half it has been quite dry.

26. The first half of the year was unusually moist.

27. Jan., 10 feet; Feb., 8 feet.; Mar., 4 to 6 feet; April, 7 feet; May, 6 feet; June, 8 feet; July, 7 feet; Aug., 10 feet; Sept., 12 feet; Oct., 12 feet; Nov. and Dec., about the same.

28. During the first half of the year it was unusually high.

Very truly,

Brooklyn, Jackson Co., Mich., Jan. 10, 1877.

E. N. PALMER.

REPLIES BY LOUIS H. WURTZ, M. D., OF COLDWATER, MICH.

Replies to Circular No. 15, relative to prevailing diseases in city of Coldwater Michigan.*

1. There was no apparent increase or decrease of population in the city of Coldwater, during the year 1876. The sickness was about the same as the average during past years.

2. About the same as the average.

11. I cannot give number of cases of the mentioned diseases. I shall in future endeavor to collect facts. Of the diseases mentioned that occurred in this city, the fatality was not unusually great. The scarlatina was mostly of the simple variety.

12. Small-pox, cholera, cerebro-spinal meningitis, diphtheria.

13. During the first 4 or 5 months of the year, scarlatina, pneumonia, bronchitis, broncho-pneumonia, measles, pulmonary consumption, and whooping-cough were the prevailing diseases. During the Summer and Autumn months, we had respectively the following diseases in this locality: diarrhea, cholera infantum, dysentery, intermittent fever, remittent fever, typhoid fever, and rheumatism.

14. None.

* The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

15. Intermittent fever.
16. None.
17. None to my knowledge.
18. Apples unusually "wormy", potato bugs injured the crop of potatoes to a great extent.
19. The actual condition, so far as quality is concerned, was better than in the previous year; but quantity, much less.
20. No.
21. Yes.
22. About an average.
23. The hay crop was more than usually affected with mildew and mould.
24. The months of January, February, March, and April were unusually mild and moist; very little snow; mostly rain; May and June, warm and large amount of rain; Summer months, quite hot.
25. I have no means of ascertaining facts.
26. Unusually moist during the first six months of the year.
27. I have made no observations.
28. I cannot state facts.

Coldwater, Branch Co., Mich., May 24, 1877.

LOUIS H. WURTZ, M. D.

REPLIES BY N. D. YALE, M. D., OF DEERFIELD, MICH.

Secretary State Board of Health:

DEAR SIR:—The following are my replies relative to prevailing diseases in 1876, in and near this place. They apply to the township of Deerfield, the eastern part of Blissfield, the southern part of Ridgeway, the western part of Summerfield, and the south-western part of Dundee. As to diseases, I mention those I attended.

1. Much greater.
2. Less, I should judge, at least no greater.
3. Malarial diseases have been very prevalent.
4. The unusual prevalence was doubtless due to excessive rains in June and July.
5. Typhoid fever was less prevalent than I ever knew it.
6. Am unable to answer.
7. Consumptives.
8. I considered it probably accidental. But I really lost more patients in 1876 from consumption, tuberculosis, than from all other causes combined. Possibly the wet season hastened the worst cases off.
11. I saw three cases of sporadic scarlet fever; three cases of typhoid; a very large number of cases of measles; a few cases of diphtheria, only one fatal, croupous form following measles. I saw a large number of cases of "scarlet rash", contagious; it resembled the very mildest forms of scarlet fever, but was followed by no sequela. Several physicians called it scarlet fever. I think it was not, but should be glad to be corrected, if I am wrong.
12. Small-pox, cholera, whooping-cough, cerebro-spinal meningitis.
- 13, 14. I cannot.
15. Whooping-cough, measles, mumps, typhoid fever, malarial intermittents and remittents.
16. Whooping-cough is unusually prevalent, not fatal.
17. Farmers lost many hogs in Winter of 1875-6. I do not know from what disease.
18. I do not know.
19. Very poor crops, from wet season. I cannot answer more definitely.
- 20, 21, 23. I do not know.
- 24, 25. Cannot.
26. Unusually moist the whole year; in June and July, excessively so.
27. In most places water was on top of ground most of the time.
28. High in July.

Very truly,

Deerfield, Lenawee Co., Mich., Jan. 20, 1877.

N. D. YALE.

REPLIES BY J. W. FALLEY, M. D., OF HILLSDALE, MICH.

DEAR DOCTOR:—If I had the time and data at hand to make a full and correct report it would afford me pleasure to do so. I can report one part of the county just about as well as another, as I am around a good deal. Let me say that I have nothing striking to report. No severe epidemics,—in general a healthy and fruitful year.

- 1.* Mild,—about the same as the year previous.
2. About the same as for the last three years.
3. None.
4. Spring and early Summer, very wet; Summer hot, and we looked for much bilious and bowel diseases, but they were light.
5. While diseases have been comparatively light, I think pneumonia is not more than one-fifth what it was 25 years ago.
6. I think the causes were the same as those which make bilious diseases so much less: viz., improvement of lands, drainage, etc.; the people are better housed, better clothed, less exposed.
- 7, 8. None.
- 9, 10. No epidemic, of any severity.
11. Small-pox, five cases in one family,—all, I believe, there have been in the county. There were reported several cases of spinal meningitis in south-west part of county, but I doubt it. I had one case. The head was drawn to one side, throat nearly paralyzed; but it was not spinal meningitis. The other epidemics mentioned in "11" have all been in some parts of the county, and though there have been a few deaths from most of them, the general affect has been very light, and scattered over the county.
12. Cholera.
13. Scarlatina, last Spring and early Summer; varioloid in December; typhoid fever most last Winter; bilious, continued, etc., in Fall; some doctors call every severe continued fever typhoid; that kind comes as often, and more so in Fall of the year; pneumonia and bronchial and rheumatic troubles, in damp and cold weather.
14. Obstetrical cases have been very much more common in this city for the last three years than formerly. I think there has been no different means used, but the same means used more effectually; I am happy to say, with a fair increase of mortals.
15. Some pneumonia, croup, for the last year; a great rheumatic tendency, with some inflammatory cases; healthy.
16. No.
17. No epidemic or endemic; healthy.
18. Potato bugs and drouth following Spring rains.
19. Less than usual, but fair in amount and quality; clover seed, very light.
20. No.
21. Nothing to wet it.
22. I do not know; but as it was dry and sound, it must be good.
23. Crop heavy; that cut early, much injured; late cut, good; it grew too heavy and had too much early rain to be best quality.
24. I kept no account. Winter exceedingly mild; Spring, Summer, and Fall unusually hot, especially June and July. Exceedingly wet till July 4; I think only six days in May but it rained; two or three showers after July 4 to 10; from that time very hot and dry. We expected much malarial diseases, but they were light and comparatively few.
25. Stated in answer "24".
26. For the two previous years the same months were wet and the same months dry, but not to so great an extent.
27. It varies vastly in the county; but the surface water was higher than in eight years before.
28. Unusually high in May and June.
29. Thanks to a kind Providence and a very healthy county and whatever else it may be, we have little trouble of that kind. For years our epidemics of scarlatina, measles, whooping-cough, etc., have been exceedingly light.

Most truly yours,

Hillsdale, Hillsdale Co., Mich., Jan 12, 1877.

J. W. FALLEY.

REPLIES BY W. B. SOUTHARD, M. D., OF KALAMAZOO, MICH.

Secretary State Board of Health :

DEAR SIR:—The Circular to Correspondents, etc., is received, and in reply I would say:*

1. Sickness from all causes during 1876 was, I believe, one-third less than the average for the past 10 years.
2. Deaths I judge to have been one-third less, except as to aged persons; I believe deaths among that class fully up to the average.

* The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

3. We have had more bilious remittents than any other disease; have had some diphtheria, and yet I would not speak of it as prevailing as an epidemic. Our bilious remittents for the last two months have been complicated with severe sore throats; they have, however, yielded readily to quinine and alteratives.

11. Scarlet fever (of mild type), measles, and whooping-cough, were somewhat prevalent during the Spring months, with but little fatality.

12. I have seen no case of cerebro-spinal meningitis or cholera, and but one case of mild varioloid.

15. Unusually healthy.

18. Potatoes were much injured by the bug; they failed to mature and are poor in quality.

19. All kinds of grains, as well as the hay crop, were well matured, unusually free from disease, and garnered in excellent condition.

25. We had heavy rains in May and June; in August and September the surface was unusually dry; in 1875 the water was unusually low, and many wells became dry; but since the heavy rains of May and June, 1876, the water has been well up.

The larger proportion of cases of diphtheria occurring in my practice has been located upon the marsh and borders of the same, skirting the south and south-eastern portion of the main part of our town, many of the families using the water from the springs which crop out from the water-level of our town along the borders of the marsh. The disease has, in the main, yielded readily to treatment, there having been comparatively but few fatal cases.

Since the report of the cases which I furnished for your report of 1875,* my attention has been particularly directed to impure water as a cause of illness, and, in many cases, death. I have three instances which I would like to report to you, in brief, hoping thereby to direct attention to what seems to me so often a cause of severe illness and death.

I was called, September 22, 1875, to the family of G. C., in the northern part of the town, where the surface is very level and was formerly somewhat wet, but since that portion of the town has been built up, seems to be quite dry. The lot upon which the house stands is but four rods deep; there is a drive-well pipe 16 feet. There was within fifteen feet a vault from which the privy had been moved and which had been covered up, and within the same distance a vault in use; there was also one on the adjoining lot, within 18 feet; the water from this well was used for drinking and culinary purposes. When called, as above stated, I found the wife and mother suffering from a low form of fever, with great irritability of the stomach and bowels, more or less diarrhea, great prostration, and nervous restlessness.

The above is a history of the condition of the different members of the family, five in all, as they came down, one after another, during the next two or three weeks. I continued to visit them until December 26; but they did not get strong until late in the Winter. All recovered. The water was discontinued soon after I first saw them. Early in the Fall of 1876 I was again called in; I found two of the children ill with diphtheria, and upon inquiry found they had again been using the water, which was at once stopped. Both recovered.

CASE 2.—October 25, 1876, I was called to visit a child of J. B., aged 5 years, ill with diphtheria. The fauces were entirely covered with membrane, which gradually extended into the trachea. She died 10 days after. On November 2, the mother also became ill, the membrane covering the entire tonsils. She recovered, in about ten days, so as to attend to her family, but at this time is not strong. We found, upon examining the premises, that they were using water from a spring the surface of which was about 18 inches below the surface of the ground, and within 12 feet was a pig-pen containing three hogs, and within 15 feet was the privy-vault.

CASE 3.—I was called to the family of H. E., November 20, 1876; I found two of the children ill of diphtheria. Upon examining their water-supply, I found the well 30 feet from the privy-vault, which had been in use several years without cleaning; a cesspool 20 feet distant, the pipe leading to it running directly past the well, and near the well the pipe had become defective. The family knew that it had leaked into the well, and had discontinued the use of the sink but continued the use of the water in the well. The children both recovered.

I have given the foregoing cases because they more particularly point to the impure water as the cause of their severe illness.

Very respectfully yours,

Kalamazoo, Kalamazoo Co., Mich., Jan. 12, 1877.

W. B. SOUTHARD, M. D.

[* See Third Annual Report of State Board of Health, pp. 63-69.—H. B. B., Sec'y.]

REPLIES BY HENRY L. JOY, M. D., OF MARSHALL, MICH.

Secretary of State Board of Health:

The following is a very incomplete reply to Circular No. 15:*

1. The proportion of sickness during the year 1876 was less than the average during previous years,—perhaps 20 per cent less.
2. Diseases of all kinds assumed a mild form, and were therefore less fatal than in previous years.
3. Had no epidemic or endemic causing more than usual number of deaths.
- 4, 5, 6, 7, 8. No answer to give.
9. Less mortality from malarial diseases.
10. I cannot say.
11. No small-pox; no cholera; a large number of cases of scarlet fever of a mild form, with only three deaths in the city; no pure cases of typhoid fever; a few cases of measles and whooping-cough; one or two cases of cerebro-spinal meningitis reported; several cases of diphtheria reported.
12. No small-pox; no cholera.
13. I cannot.
14. Scarletina during November and December, less fatal than usual.
15. Bronchial inflammations (Feb. 1, 1877).
16. No.
17. No prevailing diseases.
18. I know of no prevailing diseases among the crops.
19. Ordinarily good.
20. No.
21. I think it was.
22. I think not.
23. More affected by mildew.
24. I cannot.
25. A good degree of moisture.
26. I think it was unusually moist during August and September.
- 27, 28. I cannot.
29. I have no facts.

Very respectfully,

Marshall, Calhoun Co., Mich., Feb. 1, 1877.

HENRY L. JOY.

REPLIES BY H. C. CLAPP, M. D., OF MENDON, MICH.

Secretary of the State Board of Health:

The locality for which I report is the village of Mendon and the adjacent country within a radius of about six miles. The village is located on the north side of the St. Joseph river, about 18 feet above low water-mark, in the township of Mendon, St. Joseph county. The country on the south is prairie and level; on the east and west, a rich, sandy loam, originally oak openings; and on the north, rolling, stony, and clayey, having been formerly heavily timbered with beech and maple. There are marshes within one to four miles all around us, most of which have been successfully drained, to the great relief of the community from the ravages of malarious diseases, and of the physicians from the burden of plethoric purses.

- 1.* A little more than last year, 1875, but less than the average of previous years.
2. I should think the proportion of deaths to sickness at least 10 per cent less than the average of previous years.
3. Typho-malarial fever,—but few deaths.
4. Am of the opinion that there are certain causes operating locally in the production of these low fevers,—decaying houses, foul cellars, and impure water. My cases have principally occurred in *old* houses, generally with wooden-curbed wells, the water of which was turbid and filled with decaying vegetable particles, and tasted strongly of the old curbing. I had five cases, during the Fall, in one old house with rotten sills and an illy-ventilated cellar. The cellar (stoned) was clean but damp, and had a *musty* smell; the plastering in the house was cracked and in many places loose, and wherever the walls were papered, the paper was wrinkled and bagging, furnishing many a nest for disease germs. The curbing in the well was old and rotten, and from fear it might cave in, one of those so-called "drive pumps" had been driven into the bottom of it and the top had been covered over *tight*,—thus confining

* The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

the pestiferous air within, and in contact with the water already filled with the rotten *debris* of the curbing, and in communication with the under currents. One of the five—the mother, aged 63, died; the other four—children—had a tedious convalescence. Two years ago, in this same family, a son and daughter had typhoid fever; the son—aged 20—died, and the daughter just escaped with her life.

5. All zymotic diseases, with the exception of bilious and typho-malarial; there having been only a few cases of diphtheria; two of cerebro-spinal meningitis; and one or two mild cases of erysipelas.

6. I do not know.

7. From none.

9. From bilious diseases—intermittent, remittent, and typho-malarial,—which have been the most prevalent of any.

10. To the improved methods of treatment, and also to the draining of the marshes, which has lessened the virulence of the cause.

11. About two of cerebro-spinal meningitis; eight of diphtheria, and a large number of whooping-cough; it is difficult to determine how many, as they did not usually call for treatment. The disease commenced about December 1.

12. None of them have occurred, excepting diphtheria, cerebro-spinal meningitis, and whooping-cough; nor has any other epidemic, endemic, contagious, or infectious disease.

13. January: Bronchitis, rheumatism, erysipelas.

February: Intermittent fever, rheumatism, hepatitis, bronchitis.

March: Pneumonia, bronchitis, intermittent fever.

April: Intermittent fever, bronchitis, pneumonia.

May: Intermittent fever, erysipelas, asthma, cerebro-spinal meningitis.

June: Intermittent and remittent fevers.

July: Intermittent and remittent fevers.

August: Intermittent and remittent fevers, typho-malarial, typhoid (enteric), diarrhœa.

September: Intermittent and remittent fevers, typho-malarial, influenza, whooping-cough, diarrhœa.

October: Intermittent and remittent fevers, typho-malarial.

November: Intermittent and remittent fevers, pneumonia, diphtheria, rheumatism.

December: Pneumonia, whooping-cough, bronchitis, rheumatism, intermittent and remittent fevers, diphtheria.

14. Two-cases of cerebro-spinal meningitis in May (one died); about eight of diphtheria, during the last days of November and first few days of December, of which one died.

15. Whooping-cough, bronchitis, pneumonia, intermittent and remittent fevers, rheumatism.

16. Whooping-cough is quite prevalent now, but no cases fatal.

17. Hog cholera, to a limited extent.

On an area of about a mile and a half, in the township of Brady, Kalamazoo county, seven miles north-west of Mendon, occurred a singular epidemic among the hogs, during October. Some few died with symptoms of cholera, but a large majority had simply a *cough*; they ate well, and would not appear very sick, yet would, after a few days or sometimes weeks, suddenly and unexpectedly die. Over *fifty* hogs died in a few weeks, in that neighborhood. I could learn of no autopsies.

Right upon the heels of that endemic among hogs occurred one among horses, although not very fatal, which some called the *epizooty* and others the usual "distemper", which has continued up to the present time (Jan. 24, 1877), but which is evidently declining. I could not learn how it originated, whether through contagion from without or infection from within the district, or whether its propagation was in accordance with the laws of contagion; although the weight of opinion was in favor of its non-communicability *inter se*.

The inhabitants of the district were usually well, no contagious or infectious disease prevailing; the crops were unaffected by any disease, were secured in a very good condition; the streams were not different from their usual condition, there was no stagnant water, and so the cause of this terrible slaughter among the hogs remains a mystery, seemingly undeterminable by any known methods of investigation, but it was evidently atmospheric,—something like an influenza.

18. Crops of all kinds quite free from any disease.

19. Good.

20. Not unusually.

21. Yes, generally.

22* Less liable than usual to bank.

23. I think less, although much was deadened in color from being rained on while curing.

25. I have no data. It has been quite moist during the entire year.

26. Unusually moist during June and July.

27. I did not make the necessary observations. The average "depth of earth above the ground water" during the year was about 16 feet; depth of water in wells, from three to five feet.

28. Unusually high, during the Spring months, and until about the middle of August.

29. Concerning the contagiousness and incubation of diphtheria, I think I have had a good demonstration. A healthy boy, four years old, was taken by his parents, Nov. 24, to visit some friends about ten miles distant. They found several of their friends' children sick with diphtheria. They returned the same day, and on Nov. 27, at night, the boy came down with the disease, of a malignant character, and died Dec. 1. The day the boy died, his sister, 12 years old, who persisted in being over her little brother almost constantly, came down with it; she was quite sick a week. The oldest boy, 16 years old, I persuaded from the first to keep out of the room entirely; I also requested them to keep the sick girl from mingling with the family, until the disease had entirely disappeared.† In about five days after the girl was allowed the privileges of the house, the oldest boy came down, but had the disease mildly. The only remaining child, a babe 5 months old, nursing a bottle, was very successfully isolated, although in the same house, and escaped entirely. There were no other cases in the neighborhood, nor had there been for a year past.

Until the same precautionary measures are instituted by public authority against the spread of diphtheria and scarlet fever, as have been adopted to stay the ravages of small-pox and cholera, these most dreaded diseases will continue to have free course in their work of death, and our little ones must pay the penalty for our persistent and inexcusable neglect, as a State, to adopt and enforce the needful sanitary and statutory regulations. It is folly to trust implicitly in the supposed prophylactic virtues of sulpho-carbolate of soda, and belladonna, to the neglect of enforced hygienic rules, municipal laws, and legislative requirements; for whether the little ones partake infinitesimally of the *shadow*, or drink lustily of the substance, these medicines are wholly powerless to save.

Respectfully submitted,

Mendon, St. Joseph Co., Mich., Jan. 29, 1877.

H. C. CLAPP.

REPLIES BY EDWIN STEWART, M. D., OF MENDON, MICH.

To the Secretary of the State Board of Health:

DEAR SIR:—The following replies are respectfully submitted. The locality is the village and township of Mendon and vicinity, in the north part of St. Joseph county.*

1. About an average for the last five years. There is much less sickness in late years than formerly, say twenty-five years ago; probably less by one-half, in proportion to population.

2. About the same as the average for the last five years. The per cent of deaths to population is less than twenty to thirty years ago; but the per cent of deaths to sickness has not diminished.

3 to 10. There has been no cause for variation, in the rate of sickness or mortality this year, different from any of the last five years; though within these years we have had the most ultra extremes of heat and cold, and of moisture and dryness to which we are ever subject, without any apparent effect upon the public health. The lessened prevalence of disease for the last few years depends upon several changes of conditions; firstly, and perhaps chiefly, upon a diminution of the cause of ague, whatever that may be; secondly, upon the improved surroundings of the people in regard to food, clothing, and dwellings; the better knowledge of sanitary conditions by the people generally contributes to their health; the poor and the ignorant still furnish the physician with the greater part of his business. Doubtless something should be credited to improvement in medical treatment.

11. About ten cases of continued fever of questionable diagnosis, typhoid or typho-

*The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

[† For a further history of this case and a marked instance of apparent communication of diphtheria, see in index of this volume, "Clapp, M. D., H. C., of Mendon, letter on diphtheria".—H. B. B., Sec'y.]

malarial; numberless cases of mild whooping-cough; two cases of cerebro-spinal meningitis; and six cases of diphtheria.

12. Small-pox, cholera, scarlet fever, and measles.

13. January: Bronchitis, rheumatism, and neuralgia.

February: Bronchitis, pharyngitis, and other catarrhal affections.

March: Bronchitis, pneumonia, rheumatism.

April: Bronchitis, remittent fever, neuralgia.

May: Remittent fever, cerebro-spinal meningitis.

June: Remittent fever, and chronic disorders.

July: Remittent fever, diarrhea, and hepatic disorders.

August: Remittents, intermittents, diarrhea.

September: Intermittents, remittents, diarrhea.

October: Intermittent, remittent, and continued fever.

November: Remittent and continued fevers, and rheumatism.

December: Pneumonia, bronchitis, and whooping-cough.

14. There was none.

15. Bronchitis, whooping-cough, pneumonia, (first of January).

16. None.

17. Some "hog-cholera," unusual for this locality.

18. None, excepting mildew or mold in hay.

19. Good.

20. No.

21. Yes.

22. Less.

23. Early clover hay; more; other grass, not.

24. I have no notes of weather for 1876.

25. The soil moisture was excessive, in April, May, and June; in August and September the earth was very dry, absolutely and relatively.

27. Depth of earth above water, about 20 feet on an average; subject to variation of about two feet; but I cannot state accurately.

28. Low in January, February, and March; for the remainder of the year, I think it was about an average.

29. "*Positive knowledge*" as to causation and communicability of disease is not easily obtained; but every one has "*opinions*". It is our opinion that the following cases of sickness were caused by the water drunk. In one house situated high and dry, two cases of continued fever occurred last Fall, one following the other, running three weeks each before convalescence. I only remember the drinking-water at the time was brought from the neighbors' because the water at home was not fit to drink.

In another family, four miles distant from the first, three or four cases, one fatal, occurred, lasting from three to six weeks. At this place poor water was obtained from a drive-pump in an old, wood-curbed well, with water standing in the bottom around the pipe. This well divided the distance between the house and barn, and to save expense supplied both. In another family having representatives of continued fever all the time for the last ten weeks, and still continuing, the water used was surface water obtained from a barrel sunk in a ravine, and which also supplied the stock. It is said the family who lived in the same house before the present occupants, were sick while they used this water.

I attended two fatal cases during the Fall, one a female aged 85, and the other a boy of 17, where the well-water was said to be good, but a part of the house—which is in a flat low place where in a wet time water settles under the floor—on a stone wall, has no aperture for ventilating the space under the floor. I attended patients sick with the same fever in the same house some years ago, but they are still living.

I will give an experience concerning the communicability of typhoid. A young man was sick with enteritis, not believed to be true typhoid; he was treated awhile by a homeopathist, and then removed to the house of his friend in my neighborhood. I attended him and in due time he got well and left; but while he was getting better, and after his departure, one by one the family came down and went through well marked typhoid. One died, some lost the hair from their heads, and altogether they were left in bad condition. It was a large family in a small house, and poorly ventilated. This happened years ago. Query: Can typhoid be developed from the emanations or excretions of nonspecific enteritis? or must the first case necessarily have been true typhoid?

Yours truly,

Mendon, St. Joseph Co., Mich., February, 1877.

EDWIN STEWART, M. D.

REPLIES BY C. M. WOODWARD, M. D., TECUMSEH, MICH.

Secretary State Board of Health:

DEAR SIR:—In reply to Circular No. 15, I would say that I will answer to the best of my ability; but having had but a short residence in Tecumseh, I must leave many of the questions unanswered.*

- 1, 2. I am unable to give a correct statement.
3. Old age and erysipelas.
4. Malaria.
5. Cholera infantum.
6. Fewer children to die of it.
- 7, 8, 9. —
11. Typhoid fever, 10 cases; scarlet fever, 3 cases (sporadic).
12. None, of the other diseases mentioned.
13. I have not a full record and cannot report.
14. None such occurring.
15. Malarial and pneumonia.
16. No.
17. Colic in horses, moderately.
18. Rust in wheat, and mildew in hay. Apples do not keep well.
19. Good.
20. Not to any extent.
21. Yes.
22. Wheat does not "bank" in the bin this year at all, it did badly last year, but there is less gluten in the berry than formerly; and, as a consequence, the berry was shrunken and there is a larger proportion of starch in the flour. When there is sufficient gluten in the flour, from its *expansive* qualities under heat, the loaf of bread fills out large and to the greatest extent of the action of the yeast; and the surface of the loaf is protected by a coating of thin glassy film of hardened gluten. When there is an absence of sufficient amount of gluten, the loaf is liable to crack open in places and the contents run out; then the loaf flattens and becomes heavy and soggy and unfit for the action of the digestive fluids. Our millers are ordering their wheat from the north-west where the wheat was grown and ripened in a dryer climate; hence the flour manufactured is of a better quality. The action of too much wet or rain in the growing and ripening of the grain seems to dissolve out the glutenous portions leaving only the *bran* and *starch*.
23. More.
- 24, 25, 26. No observations.
27. Same as usual and in my previous report.
28. No observations.
29. Malaria.

As I have lived in Tecumseh only about a year and a half, you will observe that it is difficult to furnish answers to many of the questions.

Very respectfully,

Tecumseh, Lenawee Co., Mich., Jan. 8, 1877.

C. MEREDYTH WOODWARD.

REPLIES BY C. W. BACKUS, M. D., THREE RIVERS, MICH.

Secretary State Board of Health:

SIR:—Enclosed find replies relative to prevailing diseases of 1876, for the incorporated town of Three Rivers, the township of Lockport, and portions of the township of Fabius.*

1. Less. In 1876 there were 23 burials in our cemetery, 4 or 5 of them foreign to the above locality. In 1875, there were 45, about the same number foreign.
2. Less; I am not able to furnish the evidence how much less.
5. Malarial diseases.
6. To not being a dry season.
11. There has been none of those diseases.
12. I did not hear of any case of that kind. In my opinion, there were none.
15. Malarial remittent fever, ague, neuralgia, diarrhea, and cholera morbus.
16. No.
17. Hog cholera, and distemper among horses, not very bad in either class.
18. None.

* The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

19. Good.
20. No.
21. Yes.
22. No.
23. Neither.
27. Water was not very low at any time.

Our town is located at the junction of three rivers, and each of these streams is crossed by a dam for water-power purposes. Consequently when the streams get low there is much stagnant water; and the water being drawn down low to supply the mills, leaves the receded banks and marshes too dry. From that source comes most of our sickness in the dry seasons of the year. The authorities of the town try to prevent, and do prevent the consumers, or millers, from draining it too low, and make them keep it up so there is constantly a current over the dams. The diseases we have in this vicinity are malarial, remittent and intermittent fevers, hepatic disorders, rheumatism, neuralgias, etc.,—most of the sickness occurring during the months of July, August, and September. The remaining seasons are generally healthy. All the diseases we have here take the periodic form, and quinine is our sheet anchor. We have had no epidemic here since I have been in this county, 12 years. Sometimes some cases of that class occur, but they have been mild and not fatal.

Respectfully submitted,

Three Rivers, St. Joseph Co., Mich., Aug. 24, 1877.

C. W. BACKUS.

REPLIES BY EDWARD BATWELL, M. D., OF YPSILANTI, MICH.

Secretary State Board of Health:

DEAR SIR:—In reply to the questions contained in Circular 15, relative to the sanitary condition of this city and of the surrounding localities, I beg to say:

1. Comparing the amount of sickness in 1876 with that of previous years, I find, from authentic sources besides my own personal observation, that the amount of sickness this year has been fully ten per cent less than that of previous years; and

2. That the death-rate has been proportionately diminished.

3. In the spring of 1876 many cases of pulmonary consumption seemed to drop off, notwithstanding the general mildness of the preceding Winter.

5. The absence of pneumonia was commented on, notwithstanding the humid state of the atmosphere in the Spring months.

11. During the year, but one case of small-pox occurred in this city. It originated in the rag-room of one of our paper-mills, and proved fatal on the third day after the appearance of the eruption. Scarlet fever, of the mildest type, now and then would spring up. Typhoid fever (I mean genuine enteric fever), was very rare. It has become a prevailing custom to call every form of fever that does not yield to 20 grs. of quinine, typhoid, and particularly *if the remedy* has produced a dry, red-edged tongue. The pure, genuine typhoid fever of some years ago is now a comparatively rare disease, at least in this section of Michigan. During the months of October and November, whooping-cough prevailed, though of a very mild character. Diphtheria has not been prevalent during the past year, though many phagedenic ulcerations of the fauces presented themselves during the months of April and May. Here again, I would say that the disease to which we apply the name of diphtheria is very different from the scourge that visited New York some years ago, and now occasionally makes such havoc in London and Paris,—different in appearance, in symptoms, in treatment. It possesses one common trait, that is its fatality.

12. Cholera did not make its appearance, and even cholera morbus was not heard of. Cerebro-spinal meningitis did not prevail; in fact, disease of all sorts was comparatively rare. Vital statistics will, however, find a larger proportion of births in this county than has ever before been heard of. Though an "off year" for general practice, it has been a decided success for obstetrics.

15. At this present time we have no prevailing disease.

17. Even animals seem to partake of the general good health.

18. As a general thing, crops are superior, except potatoes, which are very poor and scarce.

20, 21. Wheat was harvested very well, was of good quality, and devoid of all fungus.

23. The hay crop was very large, as is fully exemplified by the avidity exhibited by farmers to pay their doctors' bills in this commodity; in quality it was good, though somewhat "dusty".

25. During the months of May and June the soil moisture was excessive.

27.* Notwithstanding, in July and August many wells in this locality ran dry.

28. It was observed that several wells that withstood the excessive drought of 1875, ran dry during the summer of 1876.

Before closing this report I would desire briefly to allude to the source of our small-pox in this city. In most all the cases it has been directly traced to those engaged in picking over rags in our paper-mills. The largest proportion of these rags, particularly the best or linen "stock", are imported in bales from France, Italy, and Germany. One can easily imagine that we have here a never failing source of contagion, and that these rags, collected from all sources, hospitals, pest houses, etc., etc., form a germ from which many of our epidemics originate. During the late war, the newspapers held up to the execration of the civilized world the name of a doctor accused of sending the clothing of yellow fever patients to northern ports; but here the same thing goes on every day under the guise of lawful trade. Cannot some remedy be devised or some means introduced to disinfect these rags previously to sending them on their mission of death and disease through the United States? I say death, for I never knew *one single case to recover that had its origin from this source*. Rags we *must* have; protection from contagion through their means *we ought* to have.† During the past year, a large increase of cancer cases has been noted among our inhabitants and through adjacent counties.

In submitting this report, I have endeavored to obtain as accurate data as circumstances would admit.

Respectfully yours,

Ypsilanti, Washtenaw Co., Mich., Dec. 31, 1876. EDWARD BATWELL, M. D.,
Health Officer of the City of Ypsilanti.

SOUTH-EASTERN DIVISION OF THE STATE.‡

REPLIES BY E. S. SNOW, M. D., OF DEARBORN, MICH.

Secretary State Board of Health:

SIR:—In reply to Circular No. 15, I would state that Dearborn is a small village 10 miles west of Detroit, on M. C. R. R., on rather more high and rolling country than Wayne county generally. It is considered a very healthy place.*

1. 25 per cent less.
2. Less.
3. Lung diseases.
4. Sudden and extreme changes from dry to wet.
5. Most malarial and febrile diseases.
6. Drainage, cultivation, and the more intelligent care that people generally take of themselves and of their homes.
7. Consumption of the lungs and cancer of stomach.
8. Uncommon and extreme changes of weather.
9. Malarial and febrile diseases, and all contagious diseases dangerous to public health.
10. Less atmospheric malaria and more judicious management in regard to spread of contagious diseases.
11. One case of spinal and two of cerebro-spinal meningitis; 8 of whooping-cough; 3 of typhoid fever.
12. Small-pox, scarlet fever, measles, diphtheria.
13. May and June: Whooping-cough.
December: Typhoid fever.
February: Diphtheria.
14. Cerebro-spinal and nervous diseases during the entire year; but not attended with a high rate of mortality.
15. Diarrhea and dysentery.
16. No.
17. Inflammation of the lungs has been quite prevalent among horses, and in a number of cases it proved fatal.
18. Potatoes, not well ripened. An unusual amount of must and mildew among grasses; and more than ordinary amount of smut on corn.

* The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

† [The exposure of these rags, spread out on racks, to a heat of 240° F., would not injure them and would thoroughly disinfect them.—H. B. B., Sec'y.]

‡ For counties included in each Division, see Exhibit 1, page 171.

19. All grains in good condition, except wheat, which was shrunken and some mildewed.

20. No grains mentioned in question 15.*

21. It was not.

22. As far as I am able to learn, they do not.

23. More.

24. All that I can state is, that the storms were very severe and the drouth also, so that twice during the Summer the crops suffered from too much wet, and twice, in the same season, from drouth.

25. Having kept no record, I am unable to answer.

26. Dry, in June and August; wet, in April and July.

27. I cannot.

28. High, in April and July; low, in June and August.

29. Scarlet fever has originated twice within a few years near an old brick-yard pond, filled with stagnant water. The first time it spread to 13 families and there were six deaths. The second time, with proper precaution, but one had it out of the family where it originated, and no one died.

Dearborn, Wayne Co., Mich., Sept., 1877.

E. S. SNOW.

REPLIES BY LEARTUS CONNOR, M. D., OF DETROIT, MICH.

DEAR DOCTOR:—Circular 15, relative to prevailing diseases, has been received from your Board. In answer to the several inquiries, I offer the following:

1. The proportion of sickness in the city of Detroit has certainly been less than the average of previous years. As to the exact diminution, I am unable to say with any degree of accuracy. I should estimate it at fifty per cent less.

2. The proportion of deaths was also diminished, but not so much as the proportion of sickness. The record of deaths kept by our city government, in previous years and even this year, is so imperfect as to be almost useless for any scientific purpose.

3. Malnutrition, as a cause of death, has been more prevalent than in previous years. Its origin is manifold. Doubtless the most important elements have been the financial reverses of the year, with their attendant worry, loss of sleep, impaired digestion, bad food, confinement in ill-ventilated apartments, dissipation, etc.

5. All infectious diseases have been less prevalent than usual.

6. Excellent drainage, fair quality of food, and an indefinable healthy state of the air.

7. Pulmonary consumption.

8. Mental depression, from financial reverses; also bad digestion, defective assimilation, imperfect respiration, confinement in bad air, etc.

12. No cholera.

15. Small-pox, diphtheria, rheumatism, scarlet fever, erysipelas, pneumonia, bronchitis.

94 Cass St., Detroit, Wayne Co., Mich., Jan. 11, 1877. LEARTUS CONNOR, M. D.

REPLIES BY W. H. ROUSE, M. D., OF DETROIT, MICH.

DEAR SIR:—The subjoined answers to Circular No. 15, relative to Prevailing Diseases, in the city of Detroit, during the year 1876, are submitted for your inspection. I regret that the data are not available that I required to answer some of the questions.

1. Less; probably 10 to 20 per cent.

2. Less. The deaths this year have been 173 less than in 1872; 289 less than in 1873; 169 less than in 1874; and 104 less than in 1875.

3. Typhoid and malarial fevers, small-pox, and diphtheria.

4. Typhoid fever, by the location of the receiving basin of our water-works. Several large sewers empty into the river above it. This will be remedied in a short time. Small-pox is more than usually prevalent. Two causes might be suggested:

(1.) Defective vaccination. Very little care seems to have been exercised in the selection of either vaccine or vaccinators. Any thing to produce a big sore on the arm has been the one thing needful. Some who trusted in the protective qualities of such vaccination have suffered from small-pox, and thus confidence has been impaired. If the State would supply pure and good bovine virus, and by law, as in England, compel all to be vaccinated, there could be but few cases of this disease.

(2.) No vaccination. The non-protective quality of the present system of vaccination, and the possibility of inoculating other diseases, have caused numbers to neglect or refuse to be vaccinated.

5. Eruptive fevers (except small-pox), whooping-cough, cholera infantum, and diseases of the intestinal tract. The number of deaths from cholera infantum, 225, seems

[* This should have been printed in the Circular, "question 19."—H. B. B., Sec'y.]

high; but the disease was not so prevalent nor so long-continued as usual. During July and August, children died very suddenly of this ailment, hence the high mortality, 100 in July, and 79 in August.

6.* There has been no epidemic, and the financial panic has induced people to live more in accordance with the laws of health. These seem to be the most obvious causes of the decrease.

7. I am not able to obtain statistics to answer definitely.

8. See answer "4".

9. Scarletina and similar diseases; but statistics are wanting.

10. See answer "6".

11. I am not able to state the number of cases of these diseases. None of them seems to have been more than usually fatal. The most of them have been very light. The subjoined mortuary table will give the best idea of their prevalence:

Table exhibiting, for the city of Detroit, Michigan, by months during the year 1876, the number of interments and the reported causes of deaths,—as compiled from reports made by superintendents of cemeteries to the city clerk.

DISEASES AND CAUSES OF DEATH.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Asthma	2	1	-----	-----	1	1	1	-----	-----	1	-----	-----	7
Asphyxia	-----	1	-----	-----	-----	-----	-----	-----	1	-----	-----	2	4
Abscess	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	1	-----	2
Apoplexy	-----	-----	1	2	1	2	-----	1	-----	-----	1	1	9
Aphthæ	-----	-----	-----	1	-----	-----	-----	1	-----	-----	-----	-----	2
Bright's Disease	3	2	2	4	-----	2	1	2	1	1	1	2	21
Brain, Inflammation of	2	4	4	6	1	5	10	3	2	2	5	1	45
Brain, Meningitis	-----	-----	-----	-----	-----	-----	2	4	2	2	-----	2	12
Brain, Men. Tubercular	-----	-----	-----	-----	2	-----	1	-----	-----	-----	1	-----	4
Brain, Softening of	-----	-----	1	2	-----	-----	1	1	-----	-----	-----	1	6
Brain, Congestion of	3	3	-----	6	5	4	11	4	2	1	-----	2	41
Brain, Water on	2	-----	3	2	2	-----	1	1	2	1	1	-----	15
Bronchitis	-----	2	2	4	6	2	-----	1	-----	2	-----	3	22
Cancer	3	4	1	2	3	3	1	1	1	2	1	2	24
Cerebro-spinal Meningitis	-----	-----	-----	-----	1	-----	1	-----	-----	-----	1	-----	3
Confinement	1	4	2	-----	-----	2	-----	-----	-----	-----	-----	-----	9
Congestion	2	1	1	3	1	1	3	2	2	-----	3	1	20
Convulsions	11	17	17	18	12	10	21	7	23	10	11	19	176
Croup	3	10	10	2	1	-----	-----	1	1	1	2	7	38
Consumption	18	17	24	20	19	12	22	19	19	13	15	12	210
Cholera Infantum	1	-----	-----	1	-----	7	100	79	33	1	1	2	225
Debility	7	11	1	5	7	8	13	8	2	5	6	6	79
Delirium Tremens	-----	-----	-----	-----	-----	-----	-----	1	-----	1	-----	-----	2
Diphtheria	1	-----	2	-----	2	2	4	4	3	11	-----	1	30
Diarrhœa	1	9	1	3	8	3	11	5	3	-----	-----	2	46
Dysentery	-----	-----	-----	1	2	4	2	7	-----	3	-----	1	20
Dropsy	1	5	1	2	4	1	2	3	1	6	3	2	31
Drowned	-----	-----	-----	-----	-----	-----	8	2	2	1	2	-----	15
Fever, Intermittent	-----	2	2	-----	-----	-----	1	1	2	1	1	-----	10
Fever, Remittent	-----	-----	1	-----	1	1	1	4	1	2	-----	1	12
Fever, Typhoid	2	2	1	5	4	2	-----	8	8	4	2	2	40
Fever, Bilious	-----	1	-----	-----	-----	-----	1	-----	-----	1	1	-----	4
Fever, Typhus	-----	1	-----	-----	1	-----	-----	5	-----	1	-----	-----	8
Heart Disease	3	3	2	3	7	8	6	2	3	2	4	9	52
Heart, Dropsy of	-----	1	1	-----	-----	-----	1	-----	1	-----	-----	1	5
Inanition	-----	-----	1	1	1	4	1	-----	1	1	-----	-----	10
Insanity	1	-----	1	-----	-----	-----	-----	-----	1	-----	-----	-----	3
Liver, Enlargement of	-----	3	-----	-----	-----	2	2	2	3	-----	-----	-----	12

* The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

TABLE.—CONTINUED.—Deaths in Detroit, by Months of year 1876.

DISEASES AND CAUSES OF DEATH.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Liver, Miscellaneous.....					1				1	1	1	1	5
Lungs, Inflammation of....	12	19	23	14	11	14	8	8	5	6	5	5	130
Lungs, Congestion of.....		6	10	7	1		1		2			1	28
Lungs, Miscellaneous.....		1	1	2	2	1		1	1	1		3	13
Marasmus.....					4	5	4	1	7	2	1	1	25
Measles.....	10	12	7	5	3	1	1				1		40
Old Age.....	2	3	5	4	4	3	5	6	2	5	5	2	46
Paralysis.....			3		2	3	2	2	1	4	1	2	20
Peritonitis.....					1		2	2	1	1	2	1	10
Puerperal Fever.....				3	1	1			1	2		1	9
Puerperal Convulsions.....						1		1			1		3
Rheumatism.....	1	2	1			1		1					6
Scarlatina.....	1	1	2		3	1	1			2	1	4	18
Scrofula.....				1		5		1		1			8
Spinal Disease.....	1				2		2		1		1	1	8
Small-pox.....		1	1	4	9	7	6	3	3	4		17	55
Suicide.....			1	2		1			1				5
Teething.....	3	1	1	1	1	2	3	3	4	1	1		21
Tumors.....	2			2	1					1		1	7
Whooping-cough.....		5	3		1	2	1	4	4		1		21
Accidents.....	1	1	5	6	8	11	1	2	4	4	4	2	49
Unknown.....	4	3	1	5	3	1	7	6	8	4	5	2	49
Died at Birth.....			2				1	1				1	5
Miscellaneous.....	9		23	16	22	1		27	28	12	20	20	178
Still-born.....	15	14	20	15	20	16	14	20	17	14	7	13	185
Interments in 1876.....	128	173	192	182	190	163	288	268	211	142	120	160	2,217
Number of these who died outside of city limits.....	11	16	19	10	15	10	19	32	22	19	8	6	187
Interments in 1875.....	189	168	178	170	177	165	319	244	220	176	146	169	2,321
Interments in 1876, more than in 1875.....		5	14	12	13			24					
Interments in 1876 less than in 1875.....	61					2	31		9	34	26	9	104

COMPARISON WITH FOUR PRECEDING YEARS.

	1872.	1873.	1874.	1875.	1876.
Number of interments.....	2,390	2,506	2,386	2,321	2,217
Interments more than in 1876.....	173	289	168	104	

Population, as per State Census in 1874,=101,245.

12. Cholera.

13. The above mortuary table will give the best data at present available. Deaths, however, do not give any definite idea of the amount of sickness; for in some seasons there are few deaths but much sickness, and *vice versa*. This year the death-rate is high compared with the amount of sickness, there having been many sudden deaths.

14. None.

15. Influenza, diphtheria, small-pox, and rheumatism. Influenza is the only one that is very prevalent.

16,* Influenza is prevalent, but not fatal.

19, 20. I do not think my limited knowledge of the crops will justify any opinion; yet it appears to me that the cereals are inferior; apples, wormy; and potatoes, poor.

24. *Meteorological Table for Detroit.*

(Information furnished by Theo. V. Van Heusen, Sergeant Signal Service, U. S. A.)

MONTHS AND YEARS.	Mean Barometer. Inches.	Highest Temperature. Degrees Fahr.	Lowest Temperature.	Mean Temperature.	Total Rainfall.	Prevailing winds.	Miles traveled by wind.	Maximum velocity of wind.	Days on which rain or snow fell.
1876.									
January.....	30.036	65	9	32.4	2.00	W.	7,150	36	19
February.....	30.036	54	4	28.6	5.59	W.	5,986	36	17
March.....	29.979	62	7	29.8	5.50	N. W.	6,646	32	20
April.....	29.964	69	25	44.0	1.80	W.	5,690	45	13
May.....	29.975	85	30	57.5	5.62	E.	4,896	20	20
June.....	29.863	88	50	69.3	1.51	S. W.	4,643	30	17
July.....	29.945	90	53	73.0	5.94	S. W.	4,293	36	12
August.....	30.002	87	46	72.1	2.46	S. W.	3,346	15	15
September.....	29.952	77	39	59.1	2.81	E.	4,487	24	20
October.....	29.917	72	24	46.2	2.89	S. W.	5,583	30	20
November.....	29.935	68	16	38.6	2.32	W.	4,233	36	21
December.....	30.015	42	-9	18.5	1.96	S. W.	5,821	35	21
1873.....	29.971	94	-12	46.4	34.00	W.	67,919	-----	-----
1874.....	30.013	97	0	48.4	26.63	S. W.	67,405	-----	-----
1875.....	29.983	90	-20	44.5	35.71	W. S. W.	66,175	-----	-----
1876.....	29.968	90	-9	47.4	40.40	S. W.	66,862	45	215

It will be observed from this table that in February, March, May, and July, the rainfall was over 5 inches each month, and from the table of interments, that the interments, in February, March, April, May, and August were more than in the corresponding months of 1875, while in all the other months they are less.

I have given no attention to "ground" moisture during the year, and I cannot, therefore, give the information you desire. The rainfall, 40.40 inches, is considerably greater than during any of the three preceding years. See the above meteorological table.

Hoping this feeble effort may be of some use, as a slight contribution to vital statistics, I remain,

Yours truly,

441 Sixth St., Detroit, Wayne Co., Mich., January, 1877.

W. H. ROUSE, M. D.

REPLIES BY ROBERT JOHNSTON, M. D., OF MILFORD, MICH.

Secretary of State Board of Health:

DEAR SIR:—Enclosed please find replies to Circular 15, relative to prevailing diseases. The locality for which replies are made is the village of Milford and the country for six miles out.*

1. The same.
2. About the same as the average.
3. Scarlet fever was more than usually prevalent and fatal in the Spring.
4. I know of no cause.
5. Typhoid fever.
6. To good drainage and pure water.
7. Scarlet fever.
8. I know of none, unless it was imperfect ventilation. See reply to Circular No. 17.†
9. Typhoid fever.
10. To good hygienic surroundings.

* The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

† [See in index of this volume, "Johnston, M. D., Robert, of Milford, Replies to Circular 17 Relative to Scarlet Fever".—H. B. B., Sec'y.]

11. About 60 cases of scarlet fever; 50 cases of whooping-cough. There were 5 cases typhoid fever and 8 cases of measles.

12. Small-pox, cholera, cerebro-spinal meningitis, diphtheria.

13. January: scarlet fever, rheumatism, intermittent fever, pneumonia.

February: Intermittent fever, scarlet fever, pneumonia, rheumatism.

March: Pneumonia, scarlet fever, intermittent fever.

April and May: No new cases under these heads.*

June: Typhoid fever, diarrhea, intermittent fever.

July: No new cases.*

August: Typhoid fever, diarrhea, bronchitis, intermittent fever.

September: Intermittent fever, cholera infantum, cholera morbus, rheumatism.

October: Dysentery, diarrhea, bronchitis, intermittent fever.

November: Whooping-cough, bronchitis, intermittent fever, influenza.

December: Scarlet fever, whooping-cough, intermittent fever, bronchitis, influenza.

14. Typhoid fever, in June; no death during the year. Scarlet fever was prevalent here January 1, 1876; 5 deaths from it during the year.

15. Intermittent fever, diarrhea, dysentery, typhoid fever, bronchitis.

16. No.

17. None.

18. Potatoes were of poor quality, and a small crop. Hop raisers say, "The hop crop was very light, and of inferior quality, and was injured by fire-blight." The fruit crop was very large and of good quality. Cereals and grasses were secured in good condition; and were an average crop as to quality and quantity.

19. In good condition.

20. No.

21. Yes.

22. Less than usually liable to bank in bin.

23. Less than usually affected by mildew or mould.

24. I have not sufficient data from which to answer correctly.

29. I was called, Aug. 24, 1877, to see Mr. Joseph Gordon and wife (aged about 53 years), who live two miles north of Milford. They were suffering with nausea, vomiting, diarrhea, and fever; they were quite sick for a week. A few days after they were taken, the rest of the family, George, Helen, and Stanley, aged respectively 23, 21, and 15 years, were taken with similar symptoms. George had been living in the village for several months, and was at home only occasionally. He was sick but a few days, complaining most of nausea, headache, and debility. Helen had a low grade of fever, lasting four weeks. There was no delirium, no rose-colored eruption, but great emaciation. The temperature was from 102° to 105°, most of the time. Stanley has now had well-marked typhoid fever for four weeks, following a severe attack of dysentery; he has had the rose-colored eruption, sudamina, iliac tenderness, and involuntary evacuations of bowels and bladder. Delirium has been almost constant. The temperature has been from 101° to 105°; it is 105° this evening.

When first called, I examined the well and tasted the water, but I did not find anything that would indicate any impurity. Mrs. G. then said that they had the best water in the neighborhood. A week later, when I spoke to George about the water, he said, "A short time since it *tasted and smelt very bad*." Mrs. G. then said, "Yes, some three weeks ago it was bad, and one day I drew a pail, and there was in the bucket the largest toad I ever saw; it was as large as my hand, was rotten, just ready to fall to pieces, and smelt so bad that I could hardly bear to lift the bucket out of the well-box." I at once tested the water, using Heisch's test; but the water proved to be pure, or at least it remained perfectly clear. I was not surprised at this; for after the putrid reptile was removed from the well, they continued to water all the stock, horses, cows, hogs, etc., from the well, using from thirty to fifty pails per day; this in a few days would change the entire quantity of water in the well. As all who used the water suffered from similar symptoms, about the same time, and as George, who used least, suffered least, I think it is very probable that putrid water was the cause of their sickness. The well is 40 feet deep; the water is usually three feet deep in the well. There had been open spaces about the top of the wall (it was stoned up), which had been closed since finding a toad had got in. The privy is five or six rods from the well. The soil is clay and gravel. The impure water had been used some two or three weeks. Several times they had sent to a neighbor's for water to drink and to make tea and coffee.

Respectfully yours,

Milford, Oakland Co., Mich., Oct. 8, 1877.

ROBERT JOHNSTON.

* [The question refers to *all* cases, new or old.—H. B. B., Sec'y.]

230 STATE BOARD OF HEALTH—REPORT OF SECRETARY, 1877.

DEAR SIR:—Geo. Gordon, after recovering from the effects of drinking impure water, and for a month being in perfect health, assisted in taking care of the other cases of typhoid fever. He was taken with typhoid fever Oct. 13, but is now convalescent.

Respectfully,

Milford, Mich., Nov. 5, 1877.

ROBERT JOHNSTON.

REPLIES BY J. M. SWIFT, M. D., OF NORTHVILLE, MICH.

Secretary State Board of Health:

In answering Circular No. 15, I can give only in part such answers as you desire. The locality for which answers are made embraces the village, a portion of this township, Plymouth, and portions contiguous of Livonia, Novi, Lyon, and Salem, in the counties of Wayne, Oakland, and Washtenaw.*

1. Less, by 25 per cent.
2. Greater.
3. Old age and its usual concomitant diseases.

Deaths in the village of Northville and vicinity during the years 1873, 1874, 1875, 1876.

YEAR.	Village of Northville.*	Northville and vicinity (as above).†	Under 20 years.	Over 20 years	Males.	Females.
1873.....	10	24	6	19	12	12
1874.....	7	23	5	18	15	8
1875.....	11	27	5	22	-----	-----
1876.....	† 18	35	5	30	22	§ 12

* Population, about 1,000. † Population (estimated) 2500. ‡ Increase over average of other years, attributed to the great number of old people who died. § One, unknown.

During the 4 years from 1873 to 1876, inclusive, the deaths, by months, were as follows:

December.....	9	March	20	June	9	September.....	10	
January.....	15	April.....	10	July.....	4	October.....	8	Total.
February.....	4	May	8	August.....	8	November.....	4	
Winter Months.	28	Spring Months.	38	Summer Months..	21	Autumn Months..	22	109

The causes of deaths in 1876, in the village of Northville and its vicinity, as described above, so far as known, were, consumption, 4; apoplexy, 5; cancer, 2; burned to death, 1; membranous croup, 1; cystitis (chronic), 1; organic diseases of heart, 2; diphtheria, 2; infantile convulsions, 1; paralysis 2; drowning, 1; erysipelas, 2; old age and concomitant diseases, 9; two infants, unknown. Of these, I am sure that 10 would average 80 years of age; one was 97 years, and 17 were about 65 years of age. The fact of so small mortality of infants, and indeed of all classes under 20 years of age, is remarkable. There has been but little sickness, as compared with former years, and no epidemic forms of disease, during the year, unless the prevalence of diphtheria during December and continuing up to this date (Jan. 13, 1877), may be epidemic.

4. Answered above.

5. Fevers of all types.

6. I do not know.

7. None. See answer "3".

11, 12. No small-pox or cholera; of scarlet fever, I have seen but two cases; of typhoid fever, none, and none of the others named, except diphtheria.

13. Nothing prevalent, except diphtheria in December.

* The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

14. —.
15. Diphtheria.
16. No.
17. I have heard or known of none.
18. Rust in wheat, to some extent.
19. Good.
20. I think not; only corn about as usual.
21. Yes.
22. I do not know.

23. Good order, remarkably good.

24. 1876.—Feb. 9 to 13, unusual amount of rain; March 28, severest snow storm of the season; April 11 and 12, thunder showers; May 5, very rainy day, much needed,—showery until May 11; June 14 to 20, showers; July 1 to 5, showers; September 6 to 14, considerable rain; October 22 to 27, considerable rain; October 30, heavy thunder shower.

For records and valuable facts given in answers "3" and "24" I am indebted to Rev. James Dabnar of this village. I can see no way by which I can communicate reliable information in answer to questions which are unnoticed.

Very respectfully,

Northville, Wayne Co., Mich., January 13, 1877.

J. M. SWIFT.

REPLIES BY WM. BROWNELL, M. D., OF UTICA, MICH.

Secretary State Board of Health:

DEAR SIR:—In answer to Circular No. 15, I herewith send report for 1876, for Utica and vicinity.

1. Less, by one-third, as compared with the last six years.
2. Less, but not in proportion to decrease of sickness.
3. None.
4. There has been no unusual prevalence of any disease.
5. Less malarial, and few or none that were contagious.
6. Improved drainage, and good fortune.
7. None.
8. There has been no unusual mortality from any disease.
9. Pneumonia, scarlet and typhoid fevers.
10. To the fact that these diseases have been less prevalent.
11. There has appeared none of the diseases named, except about one-half dozen cases of typhoid fever, and the endemic diseases incident to the locality, the number of cases of which I am unable to give, but I am sure they have been less than usual.
12. Small-pox, cholera, scarlet fever, measles, whooping-cough, cerebro-spinal meningitis.
13. I have too little data to attempt the statement.
14. None of that character has occurred during the year.
15. Whooping-cough and catarrhal colds.
16. None.
17. None, that I am aware of.
18. No crop disease in this quarter.
19. Good.
20. They were not.
21. It was.
22. Less, I should judge, as the millers say they have no reason to complain this year.
23. The hay crop was secured in good condition.
24. I have made no observations worth reporting.
25. Very uniform throughout the year.
26. As compared with the last five years, the soil moisture for 1876 has been greater,—at no time unusually dry or moist.
27. Depth of earth above ground water, 14 feet; depth of water in wells, 2½ feet; with very little variation throughout the year. The water-supply generally, in wells and streams, was better than for several years, yet at no time what might be considered high, and very few, if any, wells or streams failed during the year.
28. At no time.
29. I have nothing new or important to report under this head.

Yours respectfully,

Utica, Macomb Co., Mich., March, 1877.

WM. BROWNELL.

REPLIES BY E. A. CHAPMAN, M. D., OF WALLED LAKE, MICH.

Secretary of the State Board of Health:

SIR:—I herewith submit my answers to some of the questions in Circular No. 15. I have not sufficient data to warrant me in answering all of them. The locality for which I make this report is in the vicinity of Walled Lake, Oakland Co.*

1. Less; diminished by 25 per cent.
2. About the same as the average.
3. Age. A number of the old inhabitants of this vicinity seemed calmly and quietly to pass away without any appreciable reason.
4. —.
5. No diseases or causes of death have been less than usually prevalent.
- 6, 7, 8, 9, 10. All modified by the answers given to the preceding questions.
11. A few sporadic cases of scarlet fever, typhoid fever, measles, whooping-cough, diphtheria, and puerperal fever.
12. Small-pox, cholera, and cerebro-spinal meningitis.
- 13, 14.—
15. Pneumonia and scarlet fever.
16. None, to my knowledge.

In regard to the remaining questions, I am unable to gain sufficient information to enable me to answer them.

Respectfully yours,

Walled Lake, Oakland Co., Jan. 18, 1877.

E. A. CHAPMAN.

REPLIES BY E. P. CHRISTIAN, M. D., OF WYANDOTTE, MICH.

Secretary State Board of Health:

In reply to queries in Circular No. 15, I transmit the following:*

1. Much less; I should judge 25 to 30 per cent.
2. Decidedly less; but how much, I cannot say.
3. None.
4. —.
5. All epidemic and contagious diseases.
6. I have no theory. It is more difficult to give an opinion as to reason of less prevalence than of an increased prevalence.
7. From none.
8. —.
9. From all.
10. To less sickness and milder forms of disease.
11. No small-pox; an occasional sporadic case of scarlet fever last Winter, and two or three this last December; very few cases of typhoid last Winter and this Fall and Winter; no measles; no cerebro-spinal meningitis; rarely a case of whooping-cough; probably a dozen mild cases of diphtheria; and no other epidemic or contagious disease.
12. Small-pox, measles, cerebro-spinal meningitis.
13. There has been no epidemic.
14. Nothing of this kind, during past year.
15. Scarlet fever made its appearance a week or more since, of which there have been, to my knowledge, three cases, with one death (an infant 5 months old).
- 16, 17, 18. None.
19. Wheat, in this locality, badly affected by rust.
20. No.
21. Yes.
22. No.
23. About an average.
24. —.
25. More than for several years past.
26. Not as much as usual in Fall.
27. Varies in localities; no wells became dry this Summer or Fall, which is unusual.

In parts of the city situated on a sandy ridge, the average depth to water is from 10 to 12 feet. On other parts, but little above level of Detroit river, the average depth to water is two feet. The river this past season has been higher than known for years, even submerging during the whole season some parts of the thoroughfare

* The figures beginning paragraphs refer to questions in Circular 15, printed on pages 185-6 of this Report.

along the river. This height of water in the river has affected the supply in the wells; or, rather, the same causes which have raised the water in the lakes and river (deficient evaporation), has affected the amount of water in wells.

28. Unusually high all the year, but especially in Spring and Fall.

29. The year has been one of unusual freedom from disease,—no epidemics, very few cases of contagious diseases, and less and milder forms of ordinary endemic diseases.

Wyandotte, Wayne Co., Mich., Dec. 30, 1876.

E. P. CHRISTIAN, M. D.

DISEASES IN MICHIGAN IN 1875.

Since the publication, in the last Report, of the replies to Circular 11, relative to Diseases in 1875, replies have been received from two other correspondents. They make a useful addition to what was published in last Report. They are, therefore, inserted here, that they may be accessible to all who are or may be engaged in the study of diseases or of the sanitary conditions and history of the State. The Circular to which they reply is also here printed.

[11.] CIRCULAR TO CORRESPONDENTS RELATIVE TO PREVAILING DISEASES.

OFFICE OF THE STATE BOARD OF HEALTH, }
LANSING, MICHIGAN, December, 1875. }

To the Correspondents of the State Board of Health:

GENTLEMEN:—This Board desires to have, and to place upon record for purposes of future study in connection with records of deaths and of meteorological conditions, statements, for as many different localities in the State as possible, of the diseases prevailing during the year 1875. Will you have the kindness to send, as soon after December 31, 1875, as is convenient, to the office of this Board at Lansing, your replies to the following questions? Please use the stamped envelope enclosed herewith, and leave all additional postage to be paid at this office. In replying it will not be necessary to repeat the questions, but simply to refer to the Circular and to each question by number. Please define the locality for which your replies are made.

1. Among the people of your locality, and considering the increase or decrease of population, was the proportion of sickness from all causes during the year ending Dec. 31, 1875, greater, less, or about the same as the average during previous years? If not the same, how much was it increased or diminished?

2. Compared with previous years, and from all causes, was the proportion of deaths to inhabitants during the year 1875, greater, less, or about the same as the average? If not the same, how much was it increased or diminished?
3. What diseases, or causes of death, have been more than usually prevalent during the year 1875?
4. What diseases, or causes of death, have been less than usually prevalent?
5. From what diseases or causes has there been more than the usual mortality during the year 1875?
6. From what diseases or causes has there been less than the usual mortality?
7. State number of cases of small-pox, cholera, scarlet fever, typhoid fever, measles, whooping-cough, cerebro-spinal meningitis, diphtheria, and of any epidemic, endemic, contagious, or infectious disease that has appeared. (Facts are especially desired, but opinions are better than no statements, though it will be well to state them as opinions.)
8. Of such diseases, name those of which no case has appeared during the year 1875.
9. Please give a summary statement of the diseases which have prevailed in each month of the year 1875.
10. Please mention dates of the occurrence of any disease not usually occurring in your locality, and of any attended with an unusually high or low rate of mortality.
11. What diseases are prevailing at the time you send this statement?
12. Are any diseases now especially or unusually prevalent or fatal? If so, what diseases and to what extent?
13. What diseases have prevailed, and to what extent, among animals?
14. What diseases have prevailed, and to what extent, among the crops, as of potatoes, hops, fruits, and especially cereals and grasses, whether affected by rust, smut, "bunt," mildew, or mould?
15. As regards rye, oats, corn, buckwheat, and other grains, wheat in particular, it is desired to ascertain the actual condition when ready for market or use. Were any of these affected by any kind of fungus?
16. Was the wheat generally allowed to get thoroughly dry before it was threshed?
17. Do the wheat buyers or millers say that wheat this year is more or less than usually liable to "bank" in the bin?
18. Was the hay crop, secured during the past season, more or less than usually affected by mildew or mould?
19. Please give a summary statement of the meteorological conditions during the year 1875, specifying if possible the general characters for each month, and noting any peculiar or unusual conditions.
20. Please communicate facts bearing upon, or cases illustrating the causation or communicability of diseases.

Any suggestions which you may feel inclined to make, concerning methods which seem practicable, for the prevention of sickness or deaths from removable causes, in your locality, or in this State, need not be withheld.

As stated parenthetically after question 7, in the absence of positive knowledge, opinions are desired. The fact that it will be difficult, and sometimes impossible to give the information asked for is well understood, but the importance of the subject warrants the effort, which it is believed will not always be barren of results, but will tend to accumulate data which will eventually be of great value to the people.

By direction of the State Board of Health.

Very respectfully,

HENRY B. BAKER,

Secretary.

REPLIES TO CIRCULAR 11, RELATIVE TO PREVAILING DISEASES IN 1875, BY JOHN S. CAULKINS, M. D., OF THORNVILLE, MICH.

Secretary State Board of Health:

DEAR SIR:—Below please find replies to Circular 11.*

1. Greater, during Winter; less, during Summer; average, for the year.
2. Greater among old people than usual, during the cold months of the fore part of the year; very healthy during Summer and Fall; average, for the year.
3. None in particular, except an unusual amount of sickness among very old people.
4. Hardly a case of dysentery.
5. None, except an unusual number of deaths among very old people.
6. No death from dysentery.
7. Small-pox, no case; cholera, none; scarlet fever, not many, I remember 5 or 6; typhoid fever, I remember 6 cases; measles, an extensive epidemic, perhaps 100 cases; whooping-cough, an epidemic, perhaps 50 cases; cerebro-spinal meningitis, no case; diphtheria, a few mild sporadic cases; dysentery, no case. No other contagious or infectious disease.
8. Small-pox, Asiatic cholera, cerebro-spinal meningitis, dysentery.
9. January, February, March,—Pneumonia and whooping-cough.
- April, May,—Measles.
- Afterwards only malarious complaints, till cold weather.
- The latter part of the year was very healthy.
10. There were no diseases not usually prevalent, except the epidemics above mentioned; nor was any attended with unusual mortality.
11. Whooping-cough and bilious complaints (Nov. 15, 1876).
12. None.
- 13, 14. —.
15. The actual condition of all the crops, except corn, at market time, was good. That was very poor and soft, moulding badly in the crib. None of these crops was more than usually affected by fungus growths. This year (1876) corn has the most smut I ever saw.
16. Yes; very dry.
- 17, 18. No.
19. 1875 was a very cold year, Winter and Summer.
20. I would suggest, under this head, the issuing of a circular to correspondents, calling for information relative to the explosion of kerosene lamps. A very sad case occurred in this vicinity this current year. Three other cases have fallen under my notice, one of which was in the family of a near relative.

Respectfully,

Thornville, Mich., Nov. 15, 1876.

JOHN S. CAULKINS.

REPLIES TO CIRCULAR 11, RELATIVE TO PREVAILING DISEASES IN 1875, BY ROBERT JOHNSTON, M. D., OF MILFORD, MICH.

Secretary State Board of Health:

DEAR SIR:—I take pleasure in replying to Circular No. 11, relative to prevailing diseases. The following replies are for village and township of Milford, and for 1875.

* The figures beginning paragraphs refer to questions in Circular 11, printed on pages 233-5 of this Report.

1. About the same as usual.
2. About the same as the average.
3. *Scarlet fever of a mild type has been prevalent.
4. Typhoid fever; no case during the year.
5. Scarlet fever.
6. Typhoid fever.
7. Scarlet fever, about 150 cases; measles, 50; whooping-cough, 75; diphtheria, 1 case (imported from Kalamazoo). The case of diphtheria was isolated as soon as discovered.
8. Small-pox, cholera, typhoid fever, cerebro-spinal meningitis.
9. During January,—Typhoid pneumonia, scarlet fever, malarial fever.
February,—Typhoid pneumonia, scarlet fever, malarial fever, rheumatism.
March,—Pneumonia, scarlet fever, malarial fever, bronchitis.
April,—Measles, scarlet fever, malarial fever, pneumonia, bronchitis.
May,—Scarlet fever, measles, malarial fever.
June,—Scarlet fever, malarial fever.
July,—Malarial fever, diarrhea.
August,—Malarial fever, cholera morbus.
September,—Malarial fever, cholera infantum.
October—Malarial fever, whooping-cough.
November,—Whooping-cough, bronchitis, pneumonia, malarial fever.
December,—Pneumonia, bronchitis, whooping-cough, scarlet fever, malarial fever.
10. Diphtheria (see answer "7"), Dec. 3, 1875; scarlet fever reappeared Dec. 23, 1875.
11. Malarial fever, pneumonia, bronchitis, (one case of scarlet fever).
12. No.
13. No unusual diseases have prevailed among animals.
- 14-19. I have not sufficient data from which to answer questions 14 to 19 inclusive.
20. [See, in index to this volume, "Johnston, M. D., Robert, of Milford, Replies to Circular 17, relative to Scarlet Fever."—H. B. B., Sec'y.]

Milford, Mich., Dec. 11, 1876.

Very respectfully,

ROBERT JOHNSTON.

* The figures beginning paragraphs refer to questions in Circular 11, printed on pages 233-5 of this Report.

WEEKLY REPORTS OF DISEASES

IN MICHIGAN

DURING THE

YEAR ENDING SEPTEMBER 29, 1877,

INCLUDING A

COMPILATION OF THE WEEKLY REPORTS FROM HEALTH OFFICERS OF CITIES
AND FROM REGULAR CORRESPONDENTS OF THE STATE
BOARD OF HEALTH.

Compiled in the Office of the Secretary of the Board.

WEEKLY REPORTS OF DISEASES IN MICHIGAN DURING THE FISCAL YEAR ENDING WITH SEPTEMBER, 1877.

In the last Report was given an outline of a plan for securing a record and weekly reports of the diseases in Michigan; and two tables were included for the single month of September, 1876, illustrating a few of the many valuable statements which can be worked out from such reports.

In this article the compilation is continued and brought up to the latest time possible to include in this Report, which is for the fiscal year ending with September, 1877. This makes the compilation for a full year, though not for the calendar year. It is expected that hereafter the compilation will be so managed that each Report shall exhibit the results for a calendar year; and if this is accomplished it will necessarily be for the calendar year preceding the fiscal year for which the Report is made,—the Report for the fiscal year ending with September, 1878, to include a summary for the calendar year, 1877, the Report for the fiscal year, 1879, to contain the compilation relating to the diseases in 1878, etc. On this account and because of the great labor of making this first compilation for a full year, no elaborate study of the results for the year is attempted in this Report, but instead the attention of contributors is asked to such details as it is hoped may lead to improvements in the material for future compilations. It is believed, however, that the present results are as valuable as could have been expected, and that the Tables 1 and 2, Diseases in the State for the full year, will be found especially valuable and interesting to any one who will give them careful study.

The blanks for the weekly reports upon which this compilation is based are printed on postal cards, which are supplied to such regular Correspondents of the Board as consent to make reports, and to the Health Officers of all cities for which a return of the name of a Health Officer has been received. Blank record books in which to preserve a copy of the reports, together with comments, etc. are also supplied to the Observers of Diseases, to be retained by them. The reports are forwarded weekly to the Secretary of the Board, at Lansing. In this compilation, Table 3 was compiled directly from the cards; and Tables 1 and 2 were compiled from Table 3.

In order to perfect the system, and to secure greater uniformity of action among those who make the weekly reports of diseases, the plan was very carefully studied, written out, criticised and rewritten, and embodied in a letter, to the Observers of Diseases, which is inserted here in order to enable the reader the better to study the tables which have been compiled from their valuable contributions. The letter is as follows:

PRINTED LETTER TO OBSERVERS OF DISEASES, STATING PLAN OF WEEKLY REPORTS.

OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH, }
Lansing, Michigan, October, 1877. }

To the Observers of Diseases for the State Board of Health:

GENTLEMEN:—When the registration of diseases was commenced, it was thought that the plan was sufficiently indicated on the postal blanks supplied by the State Board of Health; and even at the time of the last Annual Report, it was thought that sufficient correspondence had taken place to secure reports in accordance with the plan: but it has been found that there are a great many ways in which it is possible slightly to vary the method, and thus make much more difficult than it would otherwise be, the necessarily difficult task of compiling the reports. Some reports it has been impossible to bring into the compilation, because they were made in such an irregular manner.

Aside from the consciousness of benevolent actions well performed, about the only recompense to be expected by the voluntary contributors to this work, is the promised information to be derived from the combination of their reports. It is therefore in the interest of the Observers of Diseases, as well as in the public interest, that an attempt be made to secure, as soon as possible, such uniformity of method as will make it possible to combine the reports in a satisfactory manner. Accordingly, referring to actual irregularities or to questions asked, I have prepared the following,—

STATEMENT OF THE PLAN FOR MAKING WEEKLY REPORTS OF DISEASES.

1. In the column headed "Prevalence, Order," opposite the disease of which there is the greatest number of cases, write the figure 1; opposite that of which there is the next greatest number of cases, write the figure 2; opposite that of which there is the next greatest number, write 3; and thus, according to the number of cases of each disease, apply consecutive numbers to all the diseases of which there have been cases in the locality during the week for which the report is made,—remembering, however, that two or more diseases of which there is the same number of cases should be marked with the same figure.

2. Write "0" opposite each disease mentioned of which there is no case.

3. If any disease not printed on the card has a greater number of cases, and is therefore, higher in the "order of prevalence," than some other disease printed on the card, it should be written on the card with its proper number opposite; as should, also, any other important disease.

4. Between the lowest and the highest numbers used, no number should be omitted, though some numbers may be repeated.

5. All cases should be included, whether the patients were taken sick that week or previously, so long as they are actually sick with the given disease.

6. It seems best that the report be made according to the Observer's best knowledge of the diseases in his locality, without regard to who may have charge of the cases.

7. Some mark should be made opposite every disease mentioned. Two diseases should not be connected by a brace opposite one figure; to do this leads to confusion and inaccuracy in compiling the reports.

8. The numbers given in the "order of prevalence" column do not show whether a disease is more or less than "usually" prevalent, or more or less prevalent than during the preceding week.*.

*Other columns are provided for the statement of both these facts on the blank *Records* supplied to Observers, and whenever the Observers feel inclined to do the additional work involved, it will probably be best to provide for these statements on the reports. As to the use of these columns in the *Records*, a word may be stated here.

a. The column headed "Prevalence, Order," remains as formerly and as explained in this printed letter.

b. The column headed "Prevalence," "Week," is designed to contain information whether the disease is increasing or decreasing in *number of cases*, and has no reference to the increase or decrease in its severity.

c. The column headed "Prevalence," "Year," is designed to contain information whether there is a greater or a less number of cases than usual, or about the same number as in former years. This column has no reference to severity.

d. The column headed "Severity" is designed to include statements relative to the severity of the disease, compared with the experience in former years and in other places.

[In order to a better understanding of this part of the letter, by those not familiar with the Record book, a section of a page of the Record book, and the explanatory notes printed thereon, are here inserted :

a. Disease of greatest prevalence 1, disease having next greatest number of cases 2, and so on. Write "0" opposite diseases not prevalent. A blank space indicates that the item has been overlooked.
b. Compared with preceding week the sign = indicates the same, + greater, — less prevalence.
c. Compared with previous years, the sign = indicates the same, + indicates greater, — indicates less prevalence.
d. The sign = indicates the usual severity, + indicates more, — indicates less than the usual severity.

Please mail a copy of this to the Secretary of the State Board of Health, Lansing, Mich., as soon as convenient after close of week specified:

Diseases in.....
.....during the week ending
Saturday,....., 187.....

	PREVALENCE.			SEVERITY.
	Order. a.	Week. b.	Year. c.	
Bronchitis				d.
Cerebro-spinal Meningitis				
Cholera Infantum.....				

9. A disease that one week was "5" or lower in the order, might be marked "1" the next week, and yet there be fewer cases of the disease the last week; because other diseases had decreased more rapidly or had disappeared altogether.

10. The numbers in the "order of prevalence" column have reference only to the relative number of cases, and have nothing to do with the severity, malignancy, importance, or fatality of a disease. Yet they do not *state* the number of cases; they show simply of what disease there were the *most* cases during the week for which the report is made, of what disease the *next highest* number, and so on.

11. If the correspondent prefers to report the number of cases, there is no objection to his doing so; provided that his method of reporting is clearly shown on every card by writing, on the right-hand *margin* of the card, the figures which denote the number of cases in his locality, "according to his best knowledge," and writing over them the word "cases." When the number of cases is very small or very large, the

exact number might be a fact of considerable interest, and well worth stating on the margin of the card, even if not generally reported.

12. The following shows the correct marking in the "order of prevalence" column, when the number of cases is as given on the margin of the card:

*Diseases in during the week ending
Saturday,, 187...*

Write "0" Disease of greatest prevalence 1, disease having next greatest number of cases 2, and so on, opposite diseases not prevalent. A blank indicates that the item has been overlooked. The sign = indicates the usual severity, + indicates more, — less than the usual severity. Please mail this as soon as convenient after close of week specified.	Prevalence.		Severity.	Cases.
	Order.	See a.	See b.	
Bronchitis	4		+	6
Cerebro-spinal Meningitis....	0		-----	0
Cholera Infantum.....	0		-----	0
Cholera Morbus.....	0		-----	0
Consumption, Pulmonary....	6		=	4
Croup, Membraneous.....	0		-----	0
Diphtheria.....	0		-----	0
Diarrhea	0		-----	0
Dysentery.....	9		—	1
Erysipelas	9		+	1
Fever, Intermittent.....	2		—	10
Fever, Remittent.....	8		=	2
Fever, Typhoid (Enteric)....	7		=	3
Fever, Typho-malarial.....	0		-----	0
Influenza	3		=	8
Measles.....	0		-----	0
Pneumonia.....	9		+	1
Puerperal Fever.....	0		-----	0
Rheumatism.....	9		—	1
Scarlatina.....	0		-----	0
Small-pox.....	0		-----	0
Whooping-cough	1		+	14
.....				
<i>Rotheln (German Measles)....</i>	5		=	5
<i>Croup, Spasmodic.....</i>	9		+	1
<i>Puerperal Mania.....</i>	8		=	2

....., M. D.

13. In the column headed "Severity," the sign "=" denotes that the disease is of the usual severity; the sign "+" denotes more, and the sign "—" less than the usual severity, compared with former years and other places. It is desirable that this column be filled.

14. In order that reports lost through the mails may be replaced, it is desirable that correspondents make and preserve a record of diseases. That this may be done is one object in supplying the record books.

15. If by any means the postal-card blanks be mislaid, or anything occur which would interrupt the weekly reports, timely notice should be given to this office, so that, if possible to prevent it, no break may occur. And when an Observer is to be absent from home for a short time, it would be well to engage some competent physician, either to make and forward the reports during his absence, or, better, to keep such a record as will enable the regular Observer to forward the reports on his return.

16. The name of the Correspondent, the locality for which the report is made, and the week for which it is a report, should be given on every card.

17. In order to enable the central officer always to know the condition of the public health throughout the State, the weekly reports should be sent as soon as possible after the close of the week for which they are made; but no report should be sent before the close of the week for which it is a report.

It is believed that the data thus collected will in time be of great value to humanity; and, although there is as yet no provision whereby this important work of the Correspondents of the Board can be properly remunerated by the State, an effort will be made to give due credit to those philanthropic Observers who thus contribute for the public good, and to prevent any necessity for outlay of money for postage, etc., by the Observer, except in the case of Health Officers, whose expenses should be paid by the local boards of health. The directed blank postal cards, and the stamped envelopes which the Observer may from time to time receive from the office of the State Board of Health, are intended for use in sending any information or suggestion which the Observer of Diseases may wish to convey, and which cannot conveniently be written at the bottom of the postal-card blanks. Any facts or suggestions bearing on the subject will, at any time, be thankfully received.

Very respectfully,

HENRY B. BAKER,

Secretary.

Notwithstanding the intention that these weekly reports should include all the most prevalent diseases, as specified in paragraph "3" in the foregoing "printed letter," it seems probable that a reporter is a little less likely to report a disease *not* on the card, even if its prevalence is greater than that of some other disease printed on the card; because the printed name of the disease is a constant reminder, and a disease not so printed may be forgotten. It is possible, therefore, that some disease not printed on the card may have been higher in the order of prevalence than some disease so printed, and here compiled. Yet this is not very likely to occur throughout the whole State and during the entire month, as the diseases on the card were carefully chosen, with reference to their relative importance, and were intended to include those most prevalent as well as those most dangerous to the public health.

Statements of some of the diseases which are reported at the bottom of cards do not appear on the tables in this compilation, for the reason that they have seemed to be of so slight importance as to be better left off. Reports of other diseases, that to some persons may seem unimportant, are published, as foot-notes, because of the light they may throw on the study of more important

diseases with which they seem to have relations. It is difficult to decide what diseases to include or to exclude, because an ailment which may seem to be entirely outside of the field of profitable investigation may at any time be found to be the very one concerning which it is desirable to have evidence.

In reporting diseases not on the card, it is desirable that reporters should use the simplest exact terms, in order to be understood, so far as is practicable, by those who have not a knowledge of technical terms.

By a study of the last four columns of Table 2 in this compilation, it will be seen that the weekly reports often omit the statement whether a disease is more or less than usually severe. This is an important point in the study of the diseases of any year, and it is hoped that Observers will more generally take the slight trouble necessary to mark the cards in reference to this point.

A reporter sometimes neglects for several weeks to send in his reports, and then brings them up to date. In this way he may forget and not report some disease, or entirely omit one or more reports. Besides, in this office the reports are studied by weeks as they come in, so that a considerable portion of their value is lost if they are received late.

One correspondent has proposed to send monthly instead of weekly reports. It is not believed, however, that results of as great value could be worked out from monthly reports. Within a month there are often great changes in the diseases of a locality, changes, moreover, not always coincident with similar changes in other localities, so that knowing what the diseases of two localities had been for any month, it would not be possible to compare them for any given part of the month. The meteorological reports, also, contain records of observations made three times each day, so that a much closer and more satisfactory comparison of diseases with meteorological conditions can be made from weekly than from monthly reports of diseases. The compilations of meteorological observations, however, are usually made by months, and it facilitates the desired comparison to *compile* the reports of diseases as nearly as possible for the same periods of time.

It usually happens that the month does not begin or end with the beginning or end of the week. In such cases, in this compilation, the week is compiled with the month in which the majority of its days come; for instance, the week which ends on February 3, 1877, is compiled with January, because four of its days come in the month of January. One exception to this rule occurs, in the case of the month of November, which, by an error not noticed till too late for correction, is made to end on November 25 instead of December 2, as the rule would require. If the whole number of reports received from an Observer, for any such month, is less than one-half of the number of weeks in the month, his reports are not compiled, because they might not give a fair expression for the entire time. It will be seen from the preceding statements, that it is possible for an Observer to report for all the weeks ending in any given month, and be represented in the compilation by only a part of the month. In the instance cited above, the Observer may have sent in a report for the weeks ending on every Saturday in February. The week ending February 3 would be included in January, and, if he had not reported for the month of January his report for that week would not be compiled at all; and, if he had not sent a report for the week ending March 3, his record for February would show only three reports.

The cards from which the tables in this compilation are made, are preserved, partly for the reason that new ideas may be advanced which would need for

their establishment or overthrow evidence which could not be obtained from the tables, but might be found in the reports themselves. The possible methods of compilation are numerous, and at some future time one may be devised which shall be much more valuable than that now adopted.

In the reports from which this compilation is made, there were some departures from the plan adopted; though whenever such have been found an effort has been made, by correspondence with the reporter and otherwise, to amend the reports in harmony with the plan.

In order to secure greater uniformity in future, examples of some of the variations from the plan, which have come to notice in the office, with remarks on them as viewed from the stand-point of the office, are given, as follows:

One correspondent wrote: "Enclosed please find the corrected copies. Probably you see how the omissions of certain numbers came. It was because at the time the errors were made I held the view that the figures should represent the relative amount of sickness." This probably means that the number 8, for instance, is to be applied to the disease of which there are twice as many cases as of that to which the number 4 is applied. This attempts to give more information than the plan contemplates, and information which is, at present, impossible of attainment. Cards marked thus could not well be compiled with those marked on the plan adopted. Others have tried thus by the numbers used to indicate the ratios of the number of cases of different diseases.

One correspondent wrote: "Weekly reports up to and inclusive of October 20, 1877, have been made on the comparison of each week with its predecessor, which I see by your circular is a wrong construction of the foot-note." For the plan on this point the reader is referred to paragraph 8, and foot-note, in the "Printed Letter Stating Plan," on page 241 of this Report.

One correspondent said: "I have no record for April 14; there was nothing prevailing, except slight, incidental maladies not of sufficient importance to note." This may overlook the fact that in some other, or in several other localities these same "slight incidental maladies" may be more wide-spread and more severe, and that the knowledge of their existence, even in slight form, in any place, taken with their greater prevalence at other places might establish their relation to meteorological or other conditions.

One correspondent said: "There is sickness, but no one disease can be said to be prevalent." It is not alone the knowledge of the special prevalence of diseases that is sought, but that of the presence even in mild form of all diseases between which and observable meteorological conditions, it may be possible to find a causal relation.

One correspondent reported severity "same as prevalence," showing a misapprehension of what is meant to be indicated by the marks in the severity column. These marks are intended to indicate only whether a disease is as severe, more severe, or less severe than usual.

One correspondent wrote on his report for April 7, 1877: "*My own*, and only new cases, no case running over from previous week counted." Another says that he marks only new cases. Their reports therefore failed to give the desired information; for there is no certainty that the order of prevalence of diseases breaking out during the week, as determined by the relative number of new cases of each disease, is the same as the order of prevalence of all the diseases present in the locality, as determined by the whole number of cases of each disease,—and the latter is the information sought. The practice of one man may or may not include all the diseases present in his locality, and may or

may not show the relative number of cases of different diseases. This attempt to secure a record and report of diseases in the State is in no way an attempt to inquire into the practice of different physicians. No one is asked to say how many patients he has from week to week. It is asked only that the Observer base his reports on the best available knowledge of the diseases in his locality. Whether that best knowledge is restricted to his own practice, each one must, of course, decide for himself.

One correspondent, Oct. 3, 1877, says: "The week ending March 24, bears diphtheria as 1 in order. I have marked it thus from the importance and malignancy of the disease, not from the number of cases; it was one sporadic case only." A compilation of cards marked thus would not well show, as it is desired to show by the present compilation, what diseases are most wide-spread at any given month in the year, both as to the number of localities in which they occur and as to the number of cases in different localities.

One correspondent marked consumption "13" in column "Order of Prevalence" on every card for March,—omitting, March 10, the numbers 9, 10, 11, 12; March 17, the numbers 7, 8, 9, 10, 11, 12; March 24, the numbers 10, 11, 12; March 31, the numbers 9, 10, 11, 12. His reason was that "As the number of cases of that disease is nearly unvarying from month to month, to make a change in the number denoting its 'order of prevalence', without having a change in the number of cases, would mislead; inasmuch as all other changes which were made were based on changes in the number of cases actually occurring." This overlooks the fact that in the weekly reports the prevalence of *any* disease is denoted not according to an absolute standard, the same for every week and for every locality, but relatively to the number of cases of other diseases occurring in the same week and in the same locality. A disease may stand higher in the "order of prevalence"—*i. e.* be denoted by a less number—this week than last, though having no more or even fewer cases this week than last; simply because other diseases have decreased more rapidly or disappeared altogether. Again, to quote from the last Annual Report: "The 'order of prevalence', taken by itself, is not a uniform and exact measure of the actual prevalence." A given disease may prevail equally in two places, and in the first place be marked 5, and in the other 10, in the 'order of prevalence,' simply because at the latter place there was a greater *number of diseases* of which there were more cases than of the given disease. If all correspondents could mark on the same absolute scale, the compilation would, of course, have greater value; but until such a scale can be found and adopted by all, it will only produce confusion for any correspondent to adopt a method of marking different from that used by the rest. In compiling these cards from this correspondent the mark for consumption was changed to the lowest omitted number. Yet this may not have been correct; for the reason that some of the omitted numbers may have corresponded to diseases not mentioned on the card.

One correspondent wrote: "I apprehend we do not all report upon the same principle; *e. g.*, one reports leading diseases in his own practice, another includes also what he knows of in the practice of other physicians. At one time there were more cases of whooping-cough than of any other disease, but very few of them taking advice from physicians. Again, I have sometimes written the same numeral opposite three or four diseases, while another never numbers any two diseases alike. Then, what diseases, if any, are proper to fill the blanks? It may happen that the printed list will fail to cover half the business."

The plan is, probably, better understood by some than by others, and positive and exact knowledge as to the relative numbers of cases of different diseases from week to week is difficult to obtain and sometimes impossible of attainment; but if each Observer will mark the cards, from week to week, "ACCORDING TO HIS BEST KNOWLEDGE OF THE DISEASES IN HIS LOCALITY," the statements of the compilation will be approximately correct and of great value.

From the foregoing examples, it might be inferred that the correspondence relative to weekly reports of diseases has been wholly with reference to errors, and, therefore, not particularly pleasant; but the truth is that the pains-taking care and the zeal and enthusiasm with which the Observers of Diseases have performed the labor incident to this work, have been very gratifying, and the reports have been much more complete and accurate than could have been expected; these facts have established the practicability of securing reliable weekly reports of diseases. The following extract from a letter is here given as an example of the words of encouragement which have been sent in, and as furnishing an indication of the philanthropical spirit which seems to prevail among those who make weekly reports to this Board:

LETTER FROM G. W. TOPPING, M. D., DE WITT, MICH.

Secretary of the State Board of Health, Lansing, Mich.:

DEAR DOCTOR:—* * * I shall be glad if my efforts contribute in any degree to show the relations existing between prevailing epidemics and meteorological conditions. I think the subject worthy of extended observation and of a careful analysis and comparison of facts collected, such an one as you are preëminently qualified to make; yet I cannot but see, what you have doubtless foreseen all along, *viz.*, that many sources of error will occur for which you are not responsible and which you cannot prevent; such as carelessness on the part of correspondents in ranking prevailing diseases, and in some instances, as in my own case, a misunderstanding of the plan of marking the cards. Another frequent source of error will be the fact that physicians are by no means uniform in naming the same disease. You are aware of the fact that one physician will name a disease Diphtheria which another would call Tonsilitis or Pharyngitis. A like discrepancy exists in naming fevers, the skin diseases, and many others; still, notwithstanding these unavoidable sources of error, there will remain enough reliable facts to make the deductions derived from them exceedingly valuable to the medical profession and to the community at large. I trust your efforts in this particular field will shed much light on the causes of diseases and receive the aid and encouragement they so well deserve.

Very respectfully,

G. W. TOPPING.

De Witt, Mich., Oct. 7, 1877.

TABLE 1.—*Exhibiting by Months of the Year ending September 29, 1877, for each of 22 Diseases, arranged in Order of Greatest Area of Prevalence in Michigan, the Per Cent of Observers reporting prevalence of, and the Average Per Cent of Weeks reported prevalent,—as compiled from 2,936 Weekly Reports by 98 Health Officers of Cities and Regular Correspondents of the State Board of Health.*

OCTOBER, 1876.				NOVEMBER, 1876.				DECEMBER, 1876.				JANUARY, 1877.				FEBRUARY, 1877.				MARCH, 1877.			
Disease.		Per ct. of Observers Reporting Prev. of.	Av. Per ct. of Weeks Prev. where Prev.	Disease.		Per ct. of Observers Reporting Prev. of.	Av. Per ct. of Weeks Prev. where Prev.	Disease.		Per ct. of Observers Reporting Prev. of.	Av. Per ct. of Weeks Prev. where Prev.	Disease.		Per ct. of Observers Reporting Prev. of.	Av. Per ct. of Weeks Prev. where Prev.	Disease.		Per ct. of Observers Reporting Prev. of.	Av. Per ct. of Weeks Prev. where Prev.	Disease.		Per ct. of Observers Reporting Prev. of.	Av. Per ct. of Weeks Prev. where Prev.
Average.....		42	69	Average.....		39	73	Average.....		41	71	Average.....		40	68	Average.....		38	73	Average.....		36	71
Fever, Intermit.		96	94	Fever, Intermit.		92	89	Bronchitis.....		88	83	Pneumonia.....		88	80	Bronchitis.....		89	82	Bronchitis.....		90	80
Rheumatism.....		80	78	Bronchitis.....		84	78	Pneumonia.....		80	80	Bronchitis.....		85	90	Rheumatism.....		86	79	Pneumonia.....		81	78
Fever, Remit.....		78	75	Rheumatism.....		70	81	Rheumatism.....		76	79	Rheumatism.....		82	83	Pneumonia.....		86	78	Rheumatism.....		79	79
Bronchitis.....		70	80	Pneumonia.....		70	63	Fever, Intermit.		75	81	Influenza.....		73	77	Influenza.....		76	86	Influenza.....		72	84
Diarrhea.....		70	74	Consumption.....		68	76	Consumption.....		75	74	Fever, Intermit.		69	69	Fever, Intermit.		69	75	Fever, Intermit.		71	81
Influenza.....		67	78	Fever, Remit.....		66	71	Influenza.....		69	88	Consumption.....		66	77	Consumption.....		52	91	Consumption.....		59	80
Pneumonia.....		59	62	Influenza.....		62	89	Fever, Remit.....		67	61	Fever, Remit.....		52	56	Fever, Remit.....		51	67	Fever, Remit.....		53	64
Fever, Typhoid.....		52	65	Diarrhea.....		50	65	Diphtheria.....		57	61	Diphtheria.....		51	65	Erysipelas.....		41	68	Erysipelas.....		40	62
Fever, Typhoid.....		50	53	Erysipelas.....		42	74	Scarlatina.....		45	61	Erysipelas.....		49	52	Scarlatina.....		38	69	Scarlatina.....		37	56
Consumption.....		46	57	Diphtheria.....		38	66	Diarrhea.....		45	57	Scarlatina.....		43	64	Diphtheria.....		38	62	Diphtheria.....		35	56
Dysentery.....		46	51	Fever, Typhoid.....		36	70	Whooping-cough.....		39	66	Diarrhea.....		43	55	Diarrhea.....		38	50	Scarlatina.....		34	64
Diphtheria.....		43	68	Fever, Typhoid.....		34	77	Erysipelas.....		39	58	Whooping-cough.....		34	66	Whooping-cough.....		32	77	Whooping-cough.....		29	68
Erysipelas.....		37	62	Whooping-cough.....		30	65	Croup, bran'tus.....		35	45	Croup, bran'tus.....		33	31	Croup, bran'tus.....		21	49	Croup, bran'tus.....		22	41
Whooping-cough.....		30	74	Scarlatina.....		26	60	Fever, Typhoid.....		31	64	Fever, Typhoid.....		24	62	Fever, Typhoid.....		18	67	Fever, Typhoid.....		21	64
Cholera Morbus.....		28	55	Membranous.....		24	52	Fever, malarial.....		14	51	Fever, malarial.....		21	64	Fever, Typhoid.....		15	40	Puerperal Fev'r.....		19	35
Cholera Infant'm.....		22	33	Dysentery.....		20	55	Dysentery.....		14	51	Puerperal Fev'r.....		16	26	Dysentery.....		13	61	Measles.....		16	57
Scarlatina.....		20	61	Cholera Morbus.....		10	45	Purperal Fever.....		12	47	Measles.....		12	63	Measles.....		10	58	Dysentery.....		12	53
Croup, Membranous.....		17	39	Puerperal Fev'r.....		10	33	Cholera Morbus.....		10	44	Dysentery.....		12	55	Cerebro-spinal.....		8	46	Fever, Typhoid.....		9	42
Puerperal Fev'r.....		7	25	Cholera Infant.....		8	44	Cerebro-spinal.....		8	45	Small-pox.....		10	30	Puerperal Fev'r.....		7	50	Cerebro-spinal.....		6	44
Small-pox.....		4	100	Cerebro-spinal.....		8	38	Measles.....		6	80	Small-pox.....		10	30	Small-pox.....		6	50	Cholera Morbus.....		4	38
Measles.....		4	71	Measles.....		6	100	Small-pox.....		4	100	Cholera Morbus.....		3	30	Cholera Morbus.....		3	25	Small-pox.....		4	100
Cerebro-spinal.....		4	38	Small-pox.....		4	100	Cholera Infant.....		4	30	Cholera Infant.....		3	30	Cholera Infant.....		0	0	Cholera Infant.....		1	50

APRIL, 1877.			MAY, 1877.			JUNE, 1877.			JULY, 1877.			AUGUST, 1877.			SEPTEMBER, 1877.		
Average.....	36	71	Average.....	38	65	Average.....	34	69	Average.....	36	73	Average.....	40	73	Average.....	40	75
Fever, Intermit.	81	86	Fever, Intermit.	93	89	Fever, Intermit.	96	93	Fever, Intermit.	93	96	Diarrhea.....	96	89	Diarrhea.....	97	84
Bronchitis.....	80	81	Rheumatism.....	83	76	Rheumatism.....	70	69	Diarrhea.....	89	82	Fever, Intermit.	95	95	Fever, Intermit.	93	95
Rheumatism.....	75	80	Fever, Remit.....	72	71	Fever, Remit.....	67	71	Fever, Remit.....	69	71	Dysentery.....	91	79	Dysentery.....	82	75
Pneumonia.....	72	75	Bronchitis.....	70	63	Consumption.....	61	82	Cholera Morbus	67	73	Fever, Remit.....	82	82	Fever, Remit.....	80	91
Consumption.....	63	83	Consumption.....	60	75	Diarrhea.....	56	61	Rheumatism.....	58	72	Cholera Morbus	77	67	Rheumatism.....	67	72
Influenza.....	59	84	Pneumonia.....	57	68	Bronchitis.....	46	68	Dysentery.....	53	60	Cholera Infant..	63	75	Fever, Typho- Fever, malarial }	63	79
Fever, Remit.....	58	65	Influenza.....	57	59	Scarlatina.....	37	50	Consumption.....	53	81	Rheumatism.....	57	57	Cholera Morbus	58	59
Scarlatina.....	50	64	Diarrhea.....	53	51	Influenza.....	33	81	Cholera Infant..	38	63	Fever, Typho- Fever, malarial }	43	65	Bronchitis.....	48	77
Erysipelas.....	38	63	Erysipelas.....	33	67	Erysipelas.....	33	60	Bronchitis.....	37	69	Consumption.....	41	84	Cholera Infant..	45	70
Diarrhea.....	33	61	Whooping-cough	33	65	Whooping-cough	32	73	Influenza.....	35	75	Whooping-cough	34	74	Consumption.....	42	89
Diphtheria.....	31	53	Scarlatina.....	33	65	Pneumonia.....	32	70	Whooping-cough	35	73	Bronchitis.....	34	63	Fever, Typhoid..	38	67
Whooping-cough	23	75	Measles.....	27	73	Cholera Morbus.	32	46	Fever, Typho- Fever, malarial }	31	71	Influenza.....	27	53	Influenza.....	35	71
Measles.....	22	62	Dysentery.....	23	43	Dysentery.....	28	47	Scarlatina.....	29	54	Fever, Typhoid..	25	53	Pneumonia.....	25	61
Fever, Typho- Fever, malarial }	19	60	Cholera Morbus	23	30	Cholera Infant..	26	42	Erysipelas.....	25	59	Fever, Typhoid..	23	73	Whooping-cough	23	78
Fever, Typhoid..	16	49	Fever, Typho- malarial }	20	60	Fever, Typho- malarial }	21	71	Pneumonia.....	24	64	Scarlatina.....	23	60	Scarlatina.....	22	72
Dysentery.....	16	48	Diphtheria.....	15	53	Measles.....	19	69	Diphtheria.....	18	53	Erysipelas.....	23	48	Diphtheria.....	22	54
Croup, bran'us }	13	39	Fever, Typhoid..	13	46	Fever, Typhoid..	11	68	Measles.....	16	53	Measles.....	14	50	Erysipelas.....	18	55
Puerperal Fev'r	11	37	Small-pox.....	10	42	Fever, Typhoid..	18	63	Small-pox.....	7	69	Diphtheria.....	11	43	Men- Group, bran'us }	10	33
Cholera Morbus	9	38	Puerperal Fev'r	10	68	Cerebro-spinal Meningitis }	11	45	Fever, Typhoid..	7	63	Measles.....	11	43	Puerperal Fev'r	7	36
Small-pox.....	8	74	Croup, bran'us }	8	56	Puerperal Fev'r	9	65	Cerebro-spinal Meningitis }	2	100	Small-pox.....	5	80	Cerebro-spinal Meningitis }	7	31
Cerebro-spinal Meningitis }	6	50	Cerebro-spinal Meningitis }	7	42	Small-pox.....	5	92	Men- Group, bran'us }	2	100	Group, bran'us }	5	43	Small-pox.....	5	67
Cholera Infant..	3	63	Cholera Infant..	7	30	Croup, bran'us }	5	50	Puerperal Fev'r	2	50	Cerebro-spinal Meningitis }	5	20	Measles.....	5	50

NOTE.—For Comments on this Table see page 251. For number of Observers, Reports, Weeks in each Month, etc., see first five columns of Exhibit 7, page 250.

EXHIBIT 7.—Giving, by months of the Year ending September 29, 1877, for the State and for each of the nine Geographical Divisions of Michigan from which Weekly Reports of Diseases were received, the Number of Observers from whom the reports were received; the Number of Reports received; the Day on which, for the purposes of this Compilation, each Month is made to end; and the Number of Weeks thus included in each Month.

MONTHS, 1876-7.	MONTHS END SATURDAY.	Number of Weeks.	STATE.		1. UPPER PEN- SULAR.		2. NORTH WEST- ERN.		4. NORTH EAST- ERN.		5. WESTERN.		6. CENTRAL.		8. DAY & EAST- ERN.		9. SOUTH WEST- ERN.		10. SOUTHERN CENTRAL.		11. SOUTH EAST- ERN.	
			Observers.	Reports,†	Observers.	Reports,†	Observers.	Reports,†	Observers.	Reports,†	Observers.	Reports,†	Observers.	Reports,†	Observers.	Reports,†	Observers.	Reports,†	Observers.	Reports,†	Observers.	Reports,†
			†		†		†		†		†		†		†		†		†		†	
Year.....	Sept. 29.....	52	493	2,936	4	107	2	56	3	77	12	290	20	578	14	356	9	294	21	633	13	545
Av. per Month.....	.....	.....	459	245	2	9	1	5	2	6	6	24	12	48	7	30	6	25	13	53	11	45
October.....	Oct. 23.....	4	46	168	1	4	1	4	2	7	4	14	9	35	8	25	4	16	9	32	8	31
November.....	Nov. 25.....	4	50	179	1	4	1	4	2	8	5	15	10	32	6	22	4	16	12	41	9	31
December.....	Dec. 30.....	5	51	250	2	10	1	5	2	10	4	20	10	49	6	30	6	29	11	52	9	45
January.....	Feb. 3.....	5	67	325	3	15	2	10	2	8	7	34	15	71	7	35	6	30	14	67	11	55
February.....	March 3.....	4	71	273	3	12	1	4	2	8	9	33	14	53	9	34	7	27	11	54	12	48
March.....	March 31.....	4	68	267	3	12	1	4	2	8	9	36	13	52	7	28	7	26	14	53	12	48
April.....	April 28.....	4	61	244	3	12	1	3	2	6	7	28	11	41	8	31	7	26	13	50	12	47
May.....	June 2.....	5	60	289	3	11	1	5	1	5	6	27	11	55	7	35	6	28	13	65	12	58
June.....	June 30.....	4	57	222	1	4	1	4	1	4	5	20	11	44	7	28	6	22	15	53	10	40
July.....	July 28.....	4	55	215	2	8	1	4	1	4	5	20	11	44	7	26	5	19	13	50	10	40
August.....	Sept. 1.....	5	56	272	2	8	1	5	1	5	5	23	11	55	6	30	7	33	12	58	11	55
September.....	Sept. 29.....	4	69	232	2	7	1	4	1	4	5	20	12	47	9	32	6	22	13	52	11	41

* For counties included in each Division, see Exhibit 1, page 171. † Reports were not received from all of the Observers, for every week, so that the number of reports received does not equal the number of Observers multiplied by the number of weeks in the given month or in the year.

‡ In some localities there were more Observers than one. The whole number of localities from which reports were received was 75; the average number per month was 53.

By Exhibit 7, page 250, may be seen the distribution of the 98 Observers in different Divisions of the State; and by Exhibit 1, page 171, the counties included in each Division can be learned. The particular locality of each Observer is stated in Table 3. An examination of Exhibit 7 will show that the numbers of Observers and of reports varies some from month to month. The value of the compilation will be enhanced in proportion as the Observers come to report for full months, and for all the months of the year.

Table 1 brings together, by months, the statements of the first two columns of Table 2, for the State, arranging, in order of greatest area of prevalence, the diseases in each month, thus facilitating a comparison of the diseases in any month, and in different months.

The first four columns of Table 2 are compiled from Table 3. In giving the per cent of Observers who report a disease prevalent, the first column of Table 2 indicates, approximately, the area of prevalence of the disease. The second and fourth columns of figures combine for all the localities at which, within the Division or the State, a given disease is reported prevalent, the statements which, in Table 3, are given for those localities individually. In comparing the statements on different diseases in the "Average Order of Prevalence" column, it should be noticed that they give that average order *only* for the localities where the diseases are reported prevalent, and that the localities at which one disease is reported prevalent are not always the same as those at which another disease is so reported. While it is not claimed that in every case the statements in this column indicate the relative numbers of cases, within the Division or State, of the several diseases reported prevalent, it is believed that this column, taken in connection with the three preceding columns, goes far toward an approximate determination of that order.

A few examples of the results which may be obtained by combinations of these columns, and which it is believed may be regarded as probably correct, are here given to illustrate some of the uses which may be made of the tables. (1.) In the statement for the Bay and Eastern Division for June, 1877 (page 282), Intermittent Fever stands "1" in the "Av. Order of Prevalence" column. The statements in the three preceding columns are that it was reported prevalent by every Observer in the Division, on every card he sent. Though one other disease, Diarrhea, is stated to have been reported prevalent for this month by 100 per cent of the Observers, it was so reported on but 68 per cent of the cards received. Consumption was reported prevalent on 82 per cent of the cards received, but only by 86 per cent of the Observers. These facts, in connection with the fact that in the column "Av. order of prevalence where prevalent" Intermittent Fever stands two units higher—*i. e.* has its order of prevalence denoted by a number smaller by two units—than any other disease, would seem to indicate that in this Division and during this month there were more cases of Intermittent Fever than of any other disease. This indication is confirmed by the fact, seen by reference to Table 3 for June, that Intermittent Fever there stands "1" in the Average Order of prevalence for every locality represented within the division. (2.) In Table 2 for the State for June, p. 258, Intermittent Fever still stands "1" in the order of prevalence; it is reported prevalent by 96 per cent of the Observers in the State, for an average of 93 per cent of the weeks of the month, and on 90 per cent of the cards received for the State. No other disease stands as high in the "Av. Order of prevalence where prevalent," none was reported prevalent by more than 70 per cent of the Observers, none was reported prevalent on more than 50 per cent

of the cards received for the State. It, therefore, seems probable that there were more cases of Intermittent Fever in the State, so far as the 54 localities from which reports were received represent the State, than of any other of the tabulated diseases. (3.) In Table 2 for the State for January, 1877, page 257, Cholera Infantum stands "2" in the column "Average order of prevalence where prevalent." But as it was reported prevalent by but 3 per cent of the Observers, for but 20 per cent of the weeks of the month, and on but 1 per cent of the cards received, the table must not be understood to mean that there were more cases of Cholera Infantum in the State in January, than of any other disease. Turning to Table 3 for January, it is seen that at each of the two localities where Cholera Infantum was reported prevalent there were several other diseases standing as high in the column "Av. order of prevalence where prevalent." This may in part account for the exceptional prominence of Cholera Infantum in the "Order" column in Table 2 for January. In Table 2 for the State for January, Bronchitis, also, stands "2" in the "Order" column (and no disease stands higher); and Bronchitis was reported prevalent by 85 per cent of the Observers, for an average of 90 per cent of the weeks of the month, and on 76 per cent of the cards; but Pneumonia and Rhenmatism were also so generally reported that while there can be but little doubt that each of these three diseases exceeded in number of cases any other disease tabulated, it is difficult to say what was their exact order of prevalence as compared with one another. It is noticeable, however, that while considered with reference to the per cent of Observers reporting prevalence of each of these diseases, Pneumonia would lead, by a slight excess over Bronchitis, and considered with reference to average per cent of weeks reported prevalent where prevalent, Rheumatism exceeds Pneumonia but is below Bronchitis,—considered with reference to the per cent of cards stating prevalence of these diseases, the order would be the same as denoted by the column "Av. order of prevalence where prevalent;" viz., Bronchitis, Pneumonia, Rhenmatism.

The foregoing may serve to show that in interpreting the evidence in the column "Av. Order of Prevalence where Prevalent," the preceding columns should always be taken into account, because the preceding columns indicate the "where prevalent," so far as regards extent of area, as well as the time of prevalence. If the "Order" column of Table 2 could be made to state for the entire Division and for the State the exact Order of prevalence of the several diseases tabulated, the value of the compilation would be increased. But no method of compiling the statements which it is practicable to obtain as to the number of cases of different diseases has thus far been devised which has seemed to indicate that order better than it is shown by a comparison of the first four columns in this table.

The third column of Table 2 combines the statements of the two preceding columns in such a way as to show, for the State or Division, the average time, combined with the average area, of prevalence of the several diseases reported prevalent.

The last four columns in Table 2, which relate to the severity of the diseases, are compiled directly from the cards. The statements on the cards were not made for all diseases by all Observers. It is hoped that hereafter the value of this part of the table may be greatly increased by statements on this point for every disease, for every week, by every Observer.

The lessened range of the numbers in the "Average Order of Prevalence"

column in Table 2 for the State for the year is partly due to the fact that no disease of great prevalence holds that prevalence uniformly throughout the year in all localities. The smallness of the numbers in that column is principally due to the fact that there are but few localities at which many diseases are reported present at any given time.

The line "Av. for Tabulated Diseases" is useful for comparing different Divisions with each other and with the State, and different months with each other and with the year, as to relative amount of sickness. It is also of use for comparing the sickness from any given disease with that from all diseases in any given month.

Table 3 gives a general idea of the diseases present each month in the localities represented, the relative order of prevalence at each locality, and what per cent of the weeks of the month each disease tabulated prevailed in the localities where it occurred. These localities are arranged alphabetically within the geographical divisions of the State from which reports were received. In comparing statements by different Observers with each other, it must be remembered that the numbers in the "Order of Prevalence" columns do not refer to an absolute scale, applicable to all localities and to different weeks, but that they are, for any given disease, an average of the numbers denoting the order of prevalence of that disease, as reported, for the several weeks of the month, by one Observer. It is not claimed that this average order is in every instance the exact order, as to number of cases for the month of the different diseases reported by that Observer. A disease which was marked "2" in order of prevalence, on the card-reports, for 2 weeks of a month of 4 weeks, and "1" for the other 2 weeks, would, under the rule adopted as to fractions, stand "2" in the "Order" column of Table 3; while a disease that was marked "1" for 3 weeks of the same month, and "2" for the other week would stand "1" in that table. But of the former disease there may have been, during the month, more cases than of the latter. Yet it is believed that these numbers generally indicate, approximately, the relative order of prevalence, at any given locality, for the month; that they indicate that order as well as it could be shown by any method practicable, of compiling the cards by months, as seems most desirable. Did space permit, it would be a most interesting addition to this compilation to publish the weekly reports themselves. It is believed, also, that to a considerable extent, useful comparison as to order of prevalence is possible, by means of Table 3, between the diseases of different localities.

Rheumatism.....	74	76	57	4.1	83	900	381	-298	6.9	73.0	31.8	-24.8
Scarlatina.....	33	63	21	4.7	27	243	243	-216	2.3	20.3	20.3	-18.0
Small-pox.....	6	76	5	7.4	12	60	35	-24	1.0	5.0	3.0	-2.0
Whooping-cough.....	31	72	23	5.1	41	340	157	-116	3.4	23.3	13.1	-9.7

NOTE.—This table was compiled from Table 2. In compiling it, a fraction less than one-half was rejected; a fraction equal to or greater than one-half was counted as one.

^a Not every one of the Observers sent in a report for every week, so that the number of reports received does not equal the number of Observers multiplied by the number of weeks.

^b Indicates the Area of Prevalence, except that in a few instances there were two or more Observers in one city or village.

^c This column is the per cent which the number of reports stating prevalence of a disease is of the number of card-reports received from such of the Observers as reported the disease prevalent. In the line "Av. for Tabulated Diseases," it is the per cent which the number of times all diseases are reported prevalent is of the number of times they *might have been* so reported on the cards received, for the time specified, from the Observers who reported the diseases prevalent at all. It will be seen that this is a more accurate average than would be obtained by dividing the sum of the column by the number of diseases reported prevalent.

^d This column is the per cent which the number of reports stating prevalence of a disease is of the whole number of reports received from all Observers in the State or Division, as the case may be. It combines and states, in a general way, an idea of the *time* a disease was prevalent, with an idea of the *area* of its prevalence. Had every Observer sent a report every week of the month or year, the numbers in this column would be the product of the numbers in the same line in the two preceding columns.

^e The disease having the greatest number of cases was to be marked 1 in the order; the disease having the next greatest number of cases, 2, and so on. Diseases not prevalent were to be reported by 0. The numbers in this column are found by dividing the totals (for the State or for the Division) of the Order of Prevalence columns, in Table 2, by the number of men who reported the disease prevalent. The "Av. for Tabulated Diseases" is found by dividing the sum of the totals in the Order of Prevalence columns, in Table 3, for all diseases reported prevalent, by the sum of the numbers of men who reported the different diseases prevalent, thus counting each man once for every disease he reported prevalent.

^f The + sign indicates that the times reported "more" exceed those reported "less" than usually severe; the — sign, that the times reported "less" exceed those reported "more," the number "more" or "less" being indicated by the figures.

^g Consumption, Remittent Fever, and Typho-malarial Fever, were not printed on the first cards sent out, and it is therefore probable that, during the first months of this compilation, they were not so fully reported as they would otherwise have been.

Small-pox		4	100	5	13	0	4	3	-3	4	100	4	13	1	3	4	-3	4	100	4	10	2	3	3	-1	
Whooping-cough		30	74	23	7	2	26	5	-3	4	100	4	26	7	2	27	8	-6	39	66	26	6	2	33	14	-12
AV. for Tabulated Diseases Reported Prevalent.		40	68	27	4.1	6.5	49.6	19.7	-13.2	73	28	4	4.8	42.7	15.6	-10.9	36	71	26	4	5.9	35.8	15.6	-9.7		
Bronchitis		85	90	76	2	16	176	34	-18	89	82	72	2	16	128	26	-10	90	80	72	2	22	115	29	-7	
Cerebro-spinal Meningitis...		3	50	2	8	0	1	4	-4	8	46	4	7	1	4	3	-2	6	44	3	5	1	3	0	+1	
Cholera Infantum		3	20	1	2	0	1	1	-1	0	0	0	0	0	0	0	0	1	50	1	4	0	0	2	-2	
Cholera Morbus		10	30	3	5	2	4	3	-1	3	25	1	4	0	1	0	0	6	38	2	3	0	0	5	-5	
Consumption, Pulmonary...		66	77	50	5	11	100	12	-1	52	91	47	5	4	87	7	-3	59	80	47	5	11	90	6	-5	
Croup, Membraneous		33	31	14	5	6	28	6	0	21	49	10	5	1	20	5	-4	22	41	9	6	0	13	9	-9	
Diphtheria		51	65	33	4	14	37	42	-28	38	62	24	5	4	19	28	-24	35	56	19	6	2	19	18	-16	
Diarrhea		43	55	24	5	3	33	32	-29	38	50	21	5	1	29	20	-19	37	56	21	5	2	24	27	-25	
Dysentery		12	63	7	8	2	7	13	-11	13	61	8	7	0	11	7	-7	12	53	6	8	1	4	8	-7	
Erysipelas		49	52	25	5	5	46	24	-19	41	68	28	6	5	43	16	-11	40	62	25	6	3	36	13	-10	
Fever, Intermittent		69	60	47	4	9	89	33	-24	69	75	52	3	8	90	27	-19	71	81	57	3	5	86	35	-30	
Fever, Remittent		52	56	30	4	4	54	26	-22	51	67	33	4	4	52	23	-19	59	64	39	4	6	49	32	-26	
Fever, Typhoid (Enteric)...		21	64	14	6	0	29	16	-16	15	40	7	5	1	5	10	-9	9	42	4	8	0	3	6	-6	
Fever, Typho-malarial		24	62	14	6	4	22	8	-4	18	67	12	6	0	15	12	-12	21	64	13	6	3	14	14	-11	
Influenza		73	77	56	3	28	106	30	-2	76	86	65	2	25	116	17	+8	72	84	60	2	39	78	21	+18	
Measles		12	55	6	5	0	14	0	0	10	58	5	6	3	7	2	+1	16	57	9	6	0	11	9	-9	
Pneumonia		88	80	70	3	21	134	38	-17	86	78	67	3	8	107	37	-29	81	78	63	3	18	86	30	-12	
Puerperal Fever		16	26	4	7	1	3	5	-4	7	50	4	6	0	8	2	-2	19	35	7	6	3	12	3	0	
Rheumatism		82	83	68	4	8	125	47	-39	86	79	68	4	7	101	40	-33	79	79	64	4	10	93	34	-24	
Scarlatina		43	64	28	5	1	32	37	-36	38	69	26	4	4	25	25	-21	34	61	22	5	4	17	24	-20	
Small-pox		10	62	6	5	2	9	3	-1	6	80	4	8	1	5	3	-2	4	100	4	7	0	9	1	-1	
Whooping-cough		34	66	23	6	6	32	19	-13	32	77	25	4	7	25	18	-11	29	68	20	4	0	25	17	-17	

a, b, c, d, e, f, g. For foot-notes and unabbreviated headings see first page of this table, page 254.

* For Number of Observers, Reports, Weeks in each Month, etc., see first five columns in Exhibit 7, page 250.

Small-pox.....	8	79	6	5	1	6	1	0	10	62	6	5	6	7	4	-4	5	92	5	4	2	3	2	0
Whooping-cough.....	23	75	18	5	2	19	7	-5	33	67	22	4	0	42	12	-12	32	73	23	4	7	28	14	-7
AV. for Tabulated Diseases Reported Prevalent.	36	73	26	4.1	3.0	33.9	12.3	-9.3	40	73	29	4.2	6.0	47.6	15.6	-9.6	40	76	31	4.4	5.0	42.6	13.7	-8.7
Bronchitis.....	37	69	25	5	0	25	21	-21	34	63	22	5	1	33	22	-21	48	77	37	5	7	50	19	-12
Cerebro-spinal Meningitis...	2	100	2	5	2	0	2	0	5	20	1	5	1	1	0	+1	7	31	2	7	0	3	3	-3
Cholera Infantum.....	38	63	24	4	4	33	11	-7	63	75	46	4	19	73	19	0	45	70	31	5	5	35	20	-15
Cholera Morbus.....	67	73	49	4	7	51	25	-18	77	67	51	4	10	98	19	-9	58	59	34	5	5	52	18	-13
Consumption, Pulmonary...	53	81	43	5	4	75	7	-3	41	84	35	6	2	79	3	-1	42	89	38	6	4	72	1	+3
Croup, Membranous.....	2	100	2	18	1	3	1	0	5	43	2	10	0	5	1	-1	10	33	3	7	1	3	2	-1
Diphtheria.....	18	53	10	7	2	9	9	-7	14	50	7	6	1	11	8	-7	22	54	12	6	4	14	7	-3
Diarrhea.....	89	82	73	3	3	117	12	-9	96	89	86	2	22	157	24	-2	97	84	81	3	7	117	37	-30
Dysentery.....	55	60	33	4	4	41	17	-13	91	79	72	3	20	104	44	-24	82	75	61	4	9	79	34	-25
Erysipelas.....	25	59	15	5	1	13	18	-17	23	48	11	6	2	9	14	-12	18	55	9	8	0	10	11	-11
Fever, Intermittent.....	93	96	90	2	11	129	23	-12	95	95	90	2	21	162	26	-5	93	95	89	2	19	142	15	+4
Fever, Remittent.....	69	71	50	3	4	71	17	-13	82	82	68	3	13	120	26	-13	80	91	72	3	16	121	10	+6
Fever, Typhoid (Enteric)....	7	63	5	6	0	5	5	-5	25	53	13	6	3	17	8	-5	38	67	25	5	8	21	12	-4
Fever, Typho-malarial.....	31	71	22	6	2	26	10	-8	43	65	27	5	4	35	18	-14	63	79	49	4	18	61	18	0
Influenza.....	35	75	26	4	2	23	24	-22	27	53	15	5	0	22	13	-13	35	71	25	5	1	31	18	-17
Measles.....	16	53	9	5	0	12	5	-5	11	43	5	6	0	4	6	-6	5	50	3	6	0	5	1	-1
Pneumonia.....	24	62	15	6	3	14	12	-9	23	60	14	7	1	16	16	-15	25	61	15	7	0	18	13	-13
Puerperal Fever.....	2	50	1	5	0	0	0	0	7	25	2	5	0	4	0	0	7	36	2	6	0	4	1	-1
Rheumatism.....	58	72	42	4	3	51	21	-21	57	57	33	5	3	51	23	-20	67	72	48	5	3	68	20	-17
Scarlatina.....	29	54	16	6	3	12	18	-15	23	73	17	7	4	8	30	-26	22	72	15	5	0	11	19	-19
Small-pox.....	7	69	5	7	3	3	3	0	5	80	4	12	0	4	5	-5	5	67	3	11	0	4	4	-4
Whooping-cough.....	35	73	25	4	7	33	7	0	34	74	25	5	4	35	18	-14	23	78	19	6	2	17	18	-16

* 1877

a, b, c, d, e, f. For foot-notes and for unabbreviated headings, see first page of this table, page 254.
 * For Number of Observers, Reports, Weeks in each Month, etc., see Exhibit 7, page 250.

Small-pox.....																												
Whooping-cough.....																												
Av. for Tabulated Diseases Reported Prevalent.....	62	67	42	3.9	.2	5.5	.5	-3	{	67	80	53	4.2	.2	5.2	.6	-4	{	75	76	57	4.1	1.0	4.9	.7	+3		
Bronchitis.....	100	87	87	3	0	13	0	0	100	100	100	3	0	12	0	0	0	100	92	92	3	3	8	1	+2			
Cerebro-spinal Meningitis.....	33	20	7	5	0	1	0	0	0	0	0	0	0	0	0	0	0											
Cholera Infantum.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0											
Cholera Morbus.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0											
Consumption, Pulmonary.....	67	60	40	5	0	5	0	0	33	100	33	4	0	4	0	0	0	67	63	42	5	0	5	0	0			
Croup, Membranous.....	33	20	7	6	1	0	0	+1	0	0	0	0	0	0	0	0	0											
Diphtheria.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0											
Diarrhea.....	100	67	67	4	1	9	0	+1	67	88	58	6	0	6	1	-1	67	100	67	6	0	7	2	-2				
Dysentery.....	33	60	20	5	0	3	0	0	100	50	50	6	0	7	0	0	33	50	17	7	0	2	0	0				
Erysipelas.....	67	40	27	6	0	4	0	0	100	75	75	6	0	9	0	0	100	75	75	6	0	9	1	-1				
Fever, Intermittent.....	33	20	7	5	0	2	0	0	0	0	0	0	0	0	0	0												
Fever, Remittent.....	67	50	33	3	0	5	0	0	67	63	42	4	0	5	0	0	67	75	50	3	0	4	0	0				
Fever, Typhoid (Enteric).....	33	60	20	5	0	2	0	0	33	25	8	7	1	0	0	+1												
Fever, Typho-malarial.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0											
Influenza.....	67	100	67	2	0	9	1	-1	100	100	100	2	2	8	1	+1	100	100	100	2	6	5	0	+6				
Measles.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0											
Pneumonia.....	100	53	53	4	1	7	0	+1	33	100	33	3	0	2	1	-1	100	42	42	5	0	4	0	0				
Puerperal Fever.....	0	0	0	0	0	0	0	0	33	25	8	5	0	1	0	0	67	25	17	5	2	1	0	+2				
Rheumatism.....	100	93	93	4	0	14	0	0	100	83	83	4	0	8	1	-1	100	100	100	4	1	10	0	+1				
Scarlatina.....	67	100	67	2	0	4	6	-6	67	100	67	3	0	2	4	-4	67	75	50	4	0	1	4	4				
Small-pox.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0											
Whooping-cough.....	33	100	33	1	0	5	0	0	33	100	33	1	0	4	0	0	33	100	33	1	0	3	0	0				

a, b, c, d, e, f, g . For foot-notes and for unabbreviated headings, see first page of this table, page 254.
 * For Number of Observers, Reports, Weeks in each Month, etc., see Exhibit 7, page 250.

TABLE 2.--Continued.—Diseases in the Upper Peninsular Division of the State,—In April, May, June, July, Aug., and Sept., 1877.

[illegible]

TABLE 2.—Continued.—Diseases in the North-Western Division of the State,—In Oct., Nov., and Dec., 1876, and Jan., Feb., and Mar., 1877.

[illegible]

Small pox.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Whooping-cough.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AV. for Tabulated Diseases Reported Prevalent.	60	43	26	3.6	.1	2.1	.3	-1	100	42	42	1	0	1.6	0	0	100	29	29	1	0	1.2	0	0	0	0	0	0	0	0	0	0	0	0	0
Bronchitis.....	100	70	70	2	0	6	1	-1	0	0	0	0	0	0	0	0	100	25	25	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Cerebro-spinal Meningitis.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cholera Infantum.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cholera Morbus.....	50	40	20	2	1	1	0	+1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Consumption, Pulmonary.....	50	80	40	6	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Croup, Membranaceous.....	50	20	10	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Diphtheria.....	50	20	10	6	1	0	0	+1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Diarrhea.....	100	30	30	4	0	3	0	0	0	0	0	0	0	0	0	0	100	25	25	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Dysentery.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Erysipelas.....	50	20	10	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Fever, Intermittent.....	50	20	10	2	0	1	0	0	100	75	75	1	0	3	0	0	100	50	50	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Fever, Remittent.....	100	22	20	5	0	1	1	-1	100	25	25	1	0	1	0	0	100	25	25	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Fever, Typhoid (Enteric).....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Fever, Typho-malarial.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Influenza.....	50	60	30	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Measles.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pneumonia.....	50	80	40	5	0	3	1	-1	100	25	25	1	0	1	0	0	100	25	25	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Puerperal Fever.....	50	20	16	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Rheumatism.....	50	80	40	4	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Scarlatina.....	50	20	16	4	0	0	1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Small-pox.....	50	80	40	2	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Whooping-cough.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

a, b, c, d, e, f, g. For foot-notes and unabbreviated headings, see first page of this table, page 254.
 * For Number of Observers, Reports, Weeks in each Month, etc., see Exhibit 7, page 250.

TABLE 2.—Continued.—Diseases in the North-Western Division of the State,—In Apr., May, June, July, Aug., and Sept., 1877.

[illegible]

[illegible]

a, b, c, d, e, f. For foot-notes and for unabbreviated headings, see first page of this table, page 254.
* For Number of Observers, Reports, Weeks in each Month, etc., see Exhibit 7, page 250.

a, b, c, d, e, f. For foot-notes and for unabbreviated headings, see first page of this table.
 * For Number of Observers Report. Weeks in each Month, etc., see Exhibit 7, page 250.

	Small-pox.....	Whooping-cough.....		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Av. for Tabulated Diseases Reported Prevalent.	50	43	27	2.9	0	2.0	.1	-1	56	36	20	1.7	.1	1.0	.5	-4	58	50	29	1.9	.3	1.3	.7	-3
Bronchitis.....	50	40	25	2	0	2	0	0	100	25	25	1	0	2	0	0	50	25	13	1	0	1	0	0
Cerebro-spinal Meningitis.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cholera Infantum.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cholera Morbus.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Consumption, Pulmonary.....	50	40	25	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Croup, Membranous.....	50	40	25	4	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Diphtheria.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Diarrhea.....	50	20	13	3	0	0	1	-1	0	0	0	0	0	0	0	0	100	50	50	2	0	2	2	
Dysentery.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Erysipelas.....	50	20	13	4	0	1	0	0	50	50	25	3	0	1	1	-1	50	50	25	3	2	0	0	
Fever, Intermittent.....	50	60	38	2	0	3	0	0	50	50	25	1	0	2	0	0	50	50	25	1	0	2	0	
Fever, Remittent.....	0	0	0	0	0	0	0	0	50	25	13	2	1	0	0	0	50	75	38	3	0	1	2	
Fever, Typhoid (Enteric).....	0	0	0	0	0	0	0	0	50	25	13	1	0	0	1	-1	0	0	0	0	0	0	0	
Fever, Typho-malarial.....	0	0	0	0	0	0	0	0	50	25	13	2	0	0	1	-1	0	0	0	0	0	0	0	
Influenza.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Measles.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pneumonia.....	50	80	50	1	0	4	0	0	50	50	25	2	0	2	0	0	50	50	25	2	0	2	0	
Puerperal Fever.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Rheumatism.....	50	40	25	4	0	2	0	0	50	50	25	2	0	1	1	-1	0	0	0	0	0	0	0	
Scarlatina.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Small-pox.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Whooping-cough.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

a, b, c, d, e, f, g. For foot-notes and for unabbreviated headings, see first page of this table, page 254.

* For Number of Observers, Reports, Weeks in each Month, etc., see Exhibit 7, page 250.

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a, *b*, *c*, *d*, *e*, *f*. For foot-notes and unabbreviated headings, see first page of this table, page 254.
*For Number of Observers, Reports, Weeks in each Month, see Exhibit 7, page 250.

* For Number of Observers, Reports, Weeks in each Month, see Exhibit 7, page 250.

Small-pox.....	25	50	14	8	7.2	2.2	-7	44	62	29	4	.9	4.5	1.4	-5	42	64	26	3.5	7	3.2	1.4	-7	
Whooping-cough.....	25	50	14	8	7.2	2.2	-7	44	62	29	4	.9	4.5	1.4	-5	42	64	26	3.5	7	3.2	1.4	-7	
Av. for Tabulated Diseases Reported Prevalent.	53	63	36	3.7	1.5	7.2	2.2	-7	44	62	29	4	.9	4.5	1.4	-5	42	64	26	3.5	7	3.2	1.4	-7
Bronchitis.....	100	82	82	3	1	25	1	0	78	72	55	3	2	12	1	+1	67	71	47	2	0	13	1	-1
Cerebro-spinal Meningitis.....	0	0	0	0	0	0	0	0	11	25	3	2	1	0	0	+1	22	25	6	5	0	1	0	0
Cholera Infantum.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cholera Morbus.....	14	40	6	5	1	1	0	+1	0	0	0	0	0	0	0	0	11	25	3	4	0	0	0	
Consumption, Pulmonary.....	86	72	62	5	4	12	1	+3	56	78	42	5	1	8	0	+1	56	65	36	4	2	6	2	0
Croup, Membranous.....	57	35	21	4	3	1	3	0	11	50	6	7	0	2	0	0	33	33	11	4	0	2	1	-1
Diphtheria.....	57	53	29	5	2	1	4	-2	44	60	27	5	2	2	3	-1	33	67	22	6	1	1	0	+1
Diarrhea.....	43	80	35	4	1	6	4	-3	44	25	18	4	1	3	1	0	56	35	19	4	0	3	3	-3
Dysentery.....	14	100	15	5	1	2	2	-1	22	38	9	6	0	0	0	0	11	25	3	4	0	0	0	0
Erysipelas.....	43	86	35	4	1	8	3	-2	44	67	30	6	1	2	1	0	56	70	39	5	1	0	3	-2
Fever, Intermittent.....	57	68	38	4	1	6	4	-3	67	68	45	4	1	8	5	-4	56	85	47	3	0	4	5	-5
Fever, Remittent.....	86	57	50	4	2	11	4	-2	78	48	39	4	0	7	3	-3	67	71	47	3	1	7	6	-5
Fever, Typhoid (Enteric).....	0	0	0	0	0	0	0	0	11	25	3	7	0	1	0	0	0	0	0	0	0	0	0	0
Fever, Typho-malarial.....	43	57	24	4	2	4	0	+2	22	88	21	3	0	3	0	0	11	100	11	3	0	0	0	0
Influenza.....	100	79	79	2	4	15	4	0	89	80	70	2	5	12	0	+5	89	78	69	2	3	8	2	+1
Measles.....	14	80	12	6	0	2	0	0	11	67	6	7	0	1	0	0	22	50	11	5	0	1	0	0
Pneumonia.....	86	90	76	3	3	19	2	+1	89	67	61	4	0	12	1	-1	67	83	56	2	2	8	1	+1
Puerperal Fever.....	29	20	6	7	0	0	2	-2	11	50	6	2	0	2	0	0	11	25	3	9	0	0	0	0
Rheumatism.....	71	83	59	3	0	14	2	-2	78	76	58	4	1	5	6	-5	67	67	44	4	0	4	3	-3
Scarlatina.....	43	47	21	3	1	1	4	-3	67	78	55	4	2	6	5	-3	44	56	25	4	3	2	0	+3
Small-pox.....	0	0	0	0	0	0	0	0	11	25	3	7	0	1	0	0	0	0	0	0	0	0	0	0
Whooping-cough.....	14	20	3	9	0	1	0	0	33	50	15	6	0	2	1	-1	11	25	3	1	0	1	0	0

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a, b, c, d, e, f, g. For foot-notes and for unabbreviated headings, see first page of this table, page 254.
 * For Number of Observers, Reports, Weeks in each Month, etc., see Exhibit 7, page 250.

Small-pox.....	51	65	33	3.9	.3	3.1	1.4	-1.1	55	70	39	3.9	.1	5.0	1.9	-1.9	51	66	34	3.6	3.1	4.3	1.1	-8
Whooping-cough.....	20	25	5	6	0	1	0	0	20	20	4	7	0	0	1	-1	20	25	5	3	0	1	0	0
AV. for Tabulated Diseases Reported Prevalent.....	40	50	20	5	0	3	0	0	60	62	35	4	0	4	3	-3	20	100	20	4	0	3	1	-1
Bronchitis.....	80	63	50	5	0	1	5	-5	80	61	48	6	0	3	5	-5	80	25	20	6	0	4	0	0
Cerebro-spinal Meningitis.....	40	75	30	5	0	6	0	0	40	90	39	4	0	9	0	0	40	100	40	4	0	8	0	0
Cholera Infantum.....	40	63	25	7	0	4	0	0	20	100	22	5	0	5	0	0	20	25	5	3	0	0	0	0
Cholera Morbus.....	100	90	90	2	0	12	1	-1	100	83	83	3	0	13	2	-2	100	65	65	3	0	10	1	-1
Consumption, Pulmonary.....	80	69	55	4	0	6	1	-1	100	78	78	3	1	7	5	-4	100	70	70	4	0	8	4	-4
Croup, Membraneous.....	40	25	10	3	0	0	2	-2	40	50	17	6	0	2	0	0	40	38	15	6	0	2	1	-1
Diphtheria.....	100	80	80	3	0	6	5	-5	100	74	74	5	0	10	3	-3	100	75	75	2	0	12	1	-1
Diarrhea.....	80	75	60	2	3	4	4	-1	80	90	78	2	0	12	4	-4	80	100	80	1	0	9	5	-5
Dysentery.....	40	75	30	5	0	6	0	0	20	40	9	3	0	1	0	0	60	67	40	5	0	2	4	-4
Erysipelas.....	40	75	30	5	0	6	0	0	20	40	9	3	0	1	0	0	40	63	25	3	3	1	0	+3
Fever, Intermittent.....	40	63	25	3	0	1	4	-4	40	50	22	5	0	4	1	-1	20	100	20	3	0	3	1	-1
Fever, Remittent.....	40	25	5	6	0	1	0	0	40	60	25	5	0	3	1	-1	20	100	20	3	0	2	0	0
Fever, Typhoid (Enteric).....	40	75	30	4	2	0	0	+2	20	40	9	3	0	1	0	0	20	100	20	3	0	2	0	0
Fever, Typho-malarial.....	40	63	25	3	0	1	4	-4	40	50	22	5	0	4	1	-1	20	100	20	3	0	2	0	0
Influenza.....	40	25	5	6	0	1	0	0	40	60	25	5	0	3	1	-1	20	100	20	3	0	2	0	0
Measles.....	40	63	25	3	0	1	4	-4	40	50	22	5	0	4	1	-1	20	100	20	3	0	2	0	0
Pneumonia.....	40	25	5	6	0	1	0	0	40	60	25	5	0	3	1	-1	20	100	20	3	0	2	0	0
Puerperal Fever.....	40	63	25	5	0	2	0	0	40	50	22	5	0	1	4	-4	60	33	20	5	0	2	0	0
Rheumatism.....	20	25	5	7	0	1	0	0	40	50	22	5	0	1	4	-4	60	33	20	5	0	2	0	0
Scarlatina.....	40	63	25	3	0	1	4	-4	40	50	22	5	0	4	1	-1	20	100	20	3	0	2	0	0
Small-pox.....	40	63	25	3	0	1	4	-4	40	50	22	5	0	4	1	-1	20	100	20	3	0	2	0	0
Whooping-cough.....	40	63	25	3	0	1	4	-4	40	50	22	5	0	4	1	-1	20	100	20	3	0	2	0	0

JULY.

a, b, c, d, e, f. For foot-notes and for unabbreviated headings, see first page of this table, page 254.
 * For Number of Observers, Reports, Weeks in each Month, etc., see Exhibit 7, page 290.

TABLE 2.—Continued.—Diseases in the Central Division of the State,—In Oct., Nov., and Dec., 1876, and Jan., Feb., and Mar., 1877.

[illegible]

TABLE 2.—Continued.—Diseases in the Central Division of the State,—In April, May, June, July, Aug., and Sept., 1877.

DISEASES.															APRIL.*																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
MONTHS.															MONTHS.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
Av. for Tabulated Diseases Reported Prevalent.	Per ct. of Observers	Where Prev. a, c	Per ct. of Reports	Stating Prev. c, d	Av. Order of Prev. e	Times Rep'd More than usually Severe.	Times Rep'd Less than usually Severe.	Difference between Times "More" and "Less" Severe.	MAY.*					JUNE.*					Per ct. of Observers	Av. Per ct. of Wks. Reported Prevalent	Per ct. of Reports	Stating Prev. c, d	Av. Order of Prev. e	Times Rep'd More than usually Severe.	Times Rep'd Less than usually Severe.	Difference between Times "More" and "Less" Severe.	Per ct. of Observers	Av. Per ct. of Wks. Reported Prevalent	Per ct. of Reports	Stating Prev. c, d	Av. Order of Prev. e	Times Rep'd More than usually Severe.	Times Rep'd Less than usually Severe.	Difference between Times "More" and "Less" Severe.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
Bronchitis.....	39	64	26	4	3	5.6	1.3	-1.0	37	65	24	3.7	.5	8.3	1.3	-6	32	64	20	2.4	.4	5.7	1.0	-9	55	91	49	3	0	12	1	-1	55	63	23	3	0	6	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Cerebro-spinal Meningitis...	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Small-pox.....	9	25	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Whooping-cough.....	36	81	32	4	0	5	1	-1	(	36	75	27	4	0	12	3	-3	{	45	75	31	5	1	12	2	-						
Av. for Tabulated Diseases Reported Prevalent.	44	72	32	3.9	.3	8.3	1.9	1.6	[	44	69	30	4.3	.5	9.8	2.0	-1.7	{	38	73	28	4.2	.3	8.0	1.4	-1.1						
Bronchitis.....	45	50	23	6	0	5	1	-1	|	27	53	15	5	0	8	0	0	|	33	53	17	6	0	6	0	0						
Cerebro-spinal Meningitis.....	0	0	0	0	0	0	0	0	|	0	0	0	0	0	0	0	0	|	8	50	4	13	0	0	3	-3						
Cholera Infantum.....	9	75	7	6	0	1	2	-2	|	36	65	24	5	0	4	4	-4	|	42	65	28	5	0	5	4	-4						
Cholera Morbus.....	56	67	36	5	2	6	3	-1	|	55	50	27	5	0	13	0	0	|	42	63	26	5	1	11	0	+1						
Consumption, Pulmonary.....	45	80	36	5	0	12	0	0	|	27	100	27	7	0	10	0	0	|	25	100	26	7	0	8	0	0						
Group, Membranous.....	0	0	0	0	0	0	0	0	|	0	0	0	0	0	0	0	0	|	8	33	2	2	0	1	0	0						
Diphtheria.....	0	0	0	0	0	0	0	0	|	9	60	5	1	0	3	0	0	|	8	75	6	6	1	0	2	-1						
Diarrhea.....	91	85	77	3	0	21	3	-3	|	91	90	82	2	2	26	3	-1	|	92	81	72	3	0	25	1	-1						
Dysentery.....	27	42	11	5	0	1	4	-4	|	73	88	64	4	3	16	8	-5	|	75	77	57	4	0	13	7	-7						
Erysipelas.....	9	25	2	2	0	1	0	0	|	18	20	4	4	0	1	0	0	|	8	25	2	5	0	1	0	0						
Fever, Intermittent.....	100	96	96	1	1	27	3	-2	|	100	93	93	2	1	32	3	-2	|	83	92	77	2	2	23	2	0						
Fever, Remittent.....	91	75	68	2	0	19	1	-1	|	91	78	71	3	0	27	0	0	|	83	87	72	3	1	23	0	+1						
Fever, Typhoid (Enteric).....	0	0	0	0	0	0	0	0	|	27	40	11	9	0	2	0	0	|	42	58	23	5	0	2	2	-2						
Fever, Typho-malarial.....	45	70	32	6	0	9	2	-2	|	64	60	38	5	0	10	6	-6	|	67	77	51	4	1	15	2	-1						
Influenza.....	27	75	20	4	0	6	1	-1	|	27	60	16	6	0	6	0	0	|	33	73	23	6	0	11	0	0						
Measles.....	0	0	0	0	0	0	0	0	|	9	20	2	7	0	1	0	0	|	8	25	2	5	0	1	0	0						
Pneumonia.....	18	63	11	8	0	2	2	-2	|	27	53	15	7	0	3	4	-4	|	25	58	15	8	0	2	4	-4						
Puerperal Fever.....	9	50	4	5	0	0	0	0	|	18	20	4	4	0	1	0	0	|	8	25	2	4	0	0	0	0						
Rheumatism.....	64	71	45	4	0	8	5	-5	|	64	49	31	5	0	11	3	-3	|	75	57	43	5	0	14	1	-1						
Scarlatina.....	27	42	11	6	0	2	2	-2	|	18	70	13	8	0	2	4	-4	|	17	57	9	2	0	1	0	0						
Small-pox.....	0	0	0	0	0	0	0	0	|	0	0	0	0	0	0	0	0	|	0	0	0	0	0	0	0	0						
Whooping-cough.....	45	70	32	5	1	12	1	0	|	45	68	31	6	0	11	3	-3	|	25	100	26	5	0	6	2	-2						

a, b, c, d, e, f. For foot-notes and for unabbreviated headings, see first page of this table, page 251.

* For Number of Observers, Reports, Weeks in each Month, etc., see Exhibit 7, page 250.

TABLE 2.—Continued.—Diseases in the Bay and Eastern Division of the State,—In Oct., Nov., and Dec., 1876, and Jan., Feb., and Mar., 1877.

DISEASES.	OCTOBER.*																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	Per ct. of Observers	Av. Per ct. of Wks. Reported Prevalent	Per ct. of Reports Stating Prevce of d	Av. Order of Prevce	Times Rep't'd More than usually Severe.	Times Rep't'd Usual Severe.	ally Severe.	Difference between Times "More" and "Less" Severe.	NOVEMBER.*			DECEMBER.*																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
(Av. for Tabulated Diseases Reported Prevalent.	43	75	33	3.8	.8	4.9	2.2	-1.4	1.4	1.4	1.9	-1.3	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1

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a, b, c, d, e, f, g. For foot-notes and for unabbreviated headings, see first page of this table, page 254.

*For Number of Observers, Reports, Weeks in each Month, etc., see Exhibit 7, page 250.

	13	100	10	4	0	1	0	0	14	100	14	3	0	1	1	-1	51	79	40	4.7	.6	8.3	1.6	0	+
(	13	33	3	3	0	0	0	0	14	80	11	4	0	2	0	0	14	75	11	3	1	0	2	-1	
Small-pox.....	46	79	38	4.1	.2	7.7	1.2	-1.0	49	76	37	4.1	.9	8.2	.9	-1	51	79	40	4.7	.6	8.3	1.6	0	+
Whooping-cough.....	46	79	38	4.1	.2	7.7	1.2	-1.0	49	76	37	4.1	.9	8.2	.9	-1	51	79	40	4.7	.6	8.3	1.6	0	+
AV. for Tabulated Diseases Reported Prevalent.																									
Bronchitis.....	43	75	35	5	0	5	3	-3	50	80	40	5	0	11	1	-1	67	95	59	5	0	14	3	0	-3
Cerebro-spinal Meningitis.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cholera Infantum.....	57	88	54	5	0	11	3	-3	83	76	63	4	2	14	2	0	56	78	44	5	0	10	1	1	-1
Cholera Morbus.....	71	94	65	4	0	13	3	-3	83	84	70	4	3	16	0	+3	67	75	56	4	1	12	2	1	-1
Consumption, Pulmonary.....	71	75	58	5	0	14	0	0	50	73	37	5	0	10	0	0	56	78	44	7	0	12	0	0	0
Croup, Membraneous.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	33	6	7	1	0	1	0	
Diphtheria.....	29	25	8	7	0	2	1	-1	17	20	3	4	0	0	1	-1	22	38	9	4	0	2	1	1	-1
Diarrhea.....	100	96	96	3	1	21	0	+1	100	97	97	2	6	16	2	+4	100	91	91	5	0	14	6	0	-6
Dysentery.....	71	75	58	4	2	11	1	+1	83	76	63	3	1	13	4	-3	56	94	47	4	0	12	0	0	0
Erysipelas.....	29	83	19	5	0	1	4	-4	33	40	13	8	0	2	2	-2	33	50	16	8	0	1	4	0	-4
Fever, Intermittent.....	86	100	92	1	0	20	0	0	83	100	83	1	2	17	0	+2	100	97	97	1	5	29	0	0	+5
Fever, Remittent.....	43	92	42	4	0	11	0	0	67	65	43	4	0	10	0	0	67	100	63	4	1	16	0	0	+1
Fever, Typhoid (Enteric).....	14	25	4	6	0	1	0	0	33	20	7	7	0	1	0	0	56	63	31	5	1	6	1	0	0
Fever, Typho-malarial.....	29	88	27	5	0	6	1	-1	33	10	33	5	0	6	3	-3	78	79	59	5	0	13	3	0	-3
Influenza.....	14	100	15	4	0	4	0	0	17	80	13	5	0	5	0	0	44	73	34	4	0	6	2	0	-2
Measles.....	29	25	8	5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pneumonia.....	0	0	0	0	0	0	0	0	17	60	10	7	0	3	0	0	33	40	13	8	0	4	0	0	0
Puerperal Fever.....	0	0	0	0	0	0	0	0	17	40	7	9	0	2	0	0	22	33	6	8	0	3	0	0	0
Rheumatism.....	71	83	58	4	0	11	4	-4	67	75	50	6	0	13	1	-1	78	92	69	5	0	15	2	0	-2
Scarlatina.....	29	25	8	8	0	1	1	-1	0	0	0	0	0	0	0	0	33	38	9	8	0	1	2	0	-2
Small-pox.....	14	25	4	6	1	6	0	+1	17	40	7	5	0	2	0	0	11	100	13	4	0	3	1	1	-1
Whooping-cough.....	29	100	31	2	0	5	1	-1	33	100	33	2	2	7	1	+1	22	100	25	4	2	1	3	0	-1

* 1877

a, b, c, d, e, f. For foot-notes and for unabbreviated headings, see first page of this table, page 254.

* For Number of Observers, Reports, Weeks in each Month, etc., see Exhibit 7, page 250.

Small-pox.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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a, b, c, d, e, f, g. For foot-notes and for unabbreviated headings, see first page of this table, page 254.

* For Number of Observers, Reports, Weeks in each Month, etc., see Exhibit 7, page 250.

TABLE 2.—Continued.—Diseases in the South-Western Division of the State,—In April, May, June, July, Aug., and Sept., 1877.

DISEASES.	MONTHS.																										
	APRIL.*																										
Av. for Tabulated Diseases Reported Prevalent.	Per ct. of Observers	Rep't'd Prev'ce of b.	Av. Per ct. of Wks. Reported Prevalent where Prev. a, c	Per ct. of Reports Stating Prev'ce of d.	Av. Order of Prevalence where Prev. e.	Times Rep't'd More than usually Severe.	Times Rep't'd Usually Severe.	Difference between Times "More" and "Less" Severe.	MONTHS.	Per ct. of Observers	Rep't'd Prev'ce of b.	Av. Per ct. of Wks. Reported Prevalent where Prev. a, c	Per ct. of Reports Stating Prev'ce of d.	Av. Order of Prevalence where Prev. e.	Times Rep't'd More than usually Severe.	Times Rep't'd Usually Severe.	Difference between Times "More" and "Less" Severe.										
Bronchitis	86	45	38	4	0	5	5	-5		52	33	20	7	3	0	1	1	-1	JUNE.*	45	61	25	29	6	4.6	8	-2
Cerebro-spinal Meningitis.....	0	0	0	0	0	0	0	0							0	0	0	0		0	0	0	0	0	0	0	0
Cholera Infantum.....	0	0	0	0	0	0	0	0							0	0	0	0		17	25	5	1	0	1	0	0
Cholera Morbus.....	14	25	4	0	0	0	0	0							0	0	0	0		33	25	9	6	0	2	0	0
Consumption, Pulmonary.....	86	77	65	4	2	0	1	0	0	17	67	20	4	4	0	1	0	0	+6	33	50	18	4	1	3	0	+1
Croup, Membranous.....	0	0	0	0	0	0	0	0							0	0	0	0		0	0	0	0	0	0	0	0
Diphtheria.....	14	50	8	4	0	0	0	2	-2						0	0	0	0		0	0	0	0	0	0	0	0
Diarrhea.....	14	100	12	2	0	0	3	-3				27	14	4	0	2	1	-1		50	42	23	3	0	3	2	-2
Dysentery.....	14	25	4	5	0	1	0	0				17	4	4	0	0	1	-1		17	25	5	6	0	0	1	-1
Erysipelas.....	29	100	27	4	0	7	0	0				38	18	2	1	2	1	0		50	70	32	3	2	5	0	+2
Fever, Intermittent.....	100	85	85	2	0	12	10	-10				100	71	2	2	15	3	-1		100	95	95	1	1	18	2	-1
Fever, Remittent.....	29	75	23	3	0	5	1	-1				70	50	2	0	10	3	-3		50	67	36	2	0	7	1	-1
Fever, Typhoid (Enteric)	14	25	4	7	0	1	0	0				0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
Fever, Typho-malarial.....	14	50	8	2	1	1	0	+1				0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
Influenza	43	73	31	3	1	6	0	+1				33	21	3	0	5	1	-1		0	0	0	0	0	0	0	0
Measles	14	67	8	3	0	2	0	0				33	21	1	0	6	0	0		17	100	9	3	0	2	0	0
Pneumonia.....	86	64	54	3	4	5	5	-1				17	14	3	2	2	0	+2		0	0	0	0	0	0	0	0
Puerperal Fever.....	14	33	4	1	0	1	0	0				0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
Rheumatism.....	86	77	65	4	0	4	13	-13				100	71	3	1	14	4	-3		83	50	41	3	0	8	1	-1
Scarlatina.....	29	63	19	4	1	1	3	-2				83	43	3	0	8	4	-4		50	27	4	4	0	2	3	-3

Small-pox.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Whooping-cough.....	0	0	0	0	0	0	0	0	0	0	0	17	40	7	3	0	2	0	0	0	0	0	0	100	18	2	0
AV. for Tabulated Diseases Reported Prevalent.																											
	58	68	40	3.2	1.0	5.8	.7	.3	58	63	37	3.9	1.5	6.9	1.7	--4	(53	66	34	3.6	.9	5.1	1.1	--2			
Bronchitis.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	38	14	5	0	3	0	0	0	
Cerebro-spinal Meningitis.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	25	9	5	0	2	0	0	0	
Cholera Infantum.....	60	58	37	3	2	5	0	+2	71	57	42	4	3	9	1	+2	17	50	9	3	0	1	0	0	0	0	
Cholera Morbus.....	80	73	58	4	3	6	2	+1	86	43	36	5	0	11	1	-1	50	30	14	6	1	2	0	+1	0	0	
Consumption, Pulmonary.....	60	91	53	5	4	5	1	+3	57	56	30	7	2	8	0	+2	50	75	41	5	4	4	0	+4	0	0	
Croup, Membranous.....	0	0	0	0	0	0	0	0	14	25	3	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
Diphtheria.....	20	25	5	3	0	0	1	-1	0	0	0	0	0	0	0	0	17	50	5	6	0	0	1	-1	0	0	
Diarrhea.....	80	67	53	2	0	10	0	0	100	85	85	2	4	23	1	+3	100	64	64	4	1	12	1	0	0	0	
Dysentery.....	20	75	16	5	0	3	0	0	100	76	76	4	5	16	3	+2	83	44	36	4	1	6	1	0	0	0	
Erysipelas.....	40	38	16	4	0	2	0	0	29	22	6	6	0	1	1	-1	17	100	9	8	0	1	1	1	0	0	
Fever, Intermittent.....	100	100	100	2	0	18	1	-1	100	100	100	2	2	26	5	-3	100	100	100	1	1	18	2	-1	0	0	
Fever, Remittent.....	60	67	42	3	0	8	0	0	100	91	91	3	2	22	6	-1	100	86	86	2	1	17	0	+1	0	0	
Fever, Typhoid (Enteric).....	0	0	0	0	0	0	0	0	14	40	6	6	0	2	0	0	83	78	64	3	6	7	0	+6	0	0	
Fever, Typho-malarial.....	0	0	0	0	0	0	0	0	43	46	18	5	2	4	0	+2	33	33	9	3	0	1	1	-1	0	0	
Influenza.....	40	43	16	3	1	2	0	+1	29	20	6	4	0	1	1	-1	0	0	0	0	0	0	0	0	0	0	
Measles.....	0	0	0	0	0	0	0	0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
Pneumonia.....	0	0	0	0	0	6	0	0	14	20	3	5	0	0	0	0	33	50	14	4	0	1	2	-2	0	0	
Puerperal Fever.....	0	0	0	0	0	0	0	0	---	---	---	---	---	---	---	---	0	0	0	0	0	0	0	0	0	0	
Rheumatism.....	80	53	42	3	0	8	0	0	71	29	21	5	1	3	2	-1	50	58	32	3	0	3	3	-3	0	0	
Scarlatina.....	100	58	58	3	3	4	4	-1	71	74	52	5	3	3	11	-8	50	83	45	4	0	3	6	-6	0	0	
Small-pox.....	0	0	0	0	0	0	0	0	---	---	---	---	---	---	---	---	0	0	0	0	0	0	0	0	0	0	
Whooping-cough.....	20	100	21	1	0	4	0	0	29	40	12	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	

a, b, c, d, e, f . For foot-notes and for unabbreviated headings, see first page of this table, page 254.

* For Number of Observers, Reports. Weeks in each Month, etc., see Exhibit 7, page 250.

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	Small-pox.....	Whooping-cough.....	AVERAGE																									
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	33	42	16	5	1	4	0	+1	23	75	20	4	1	5	0	+1	45	0	0	0	0	0	0	0	0	0	0	0
	43	67	28	34	18	9.1	5.5	-3.8	{	33	72	27	3.4	1.4	6.3	4.9	-3.5	35	74	26	3.9	1.1	5.7	3.8	-2.6	-2.6	-2.6	-2.6
Average for Tabulated Diseases Reported Prevalent.																												
Bronchitis.....	86	93	79	2	7	34	7	0	93	81	72	2	4	19	10	-6	93	100	92	2	8	20	11	-3	-3	-3	-3	-3
Cerebro-spinal Meningitis.....	7	80	6	10	0	0	4	-4	7	100	7	8	0	1	2	-2	7	100	8	7	1	1	0	+1	+1	+1	+1	+1
Cholera Infantum.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	50	4	4	0	0	2	-2	-2	-2	-2	
Cholera Morbus.....	14	20	3	3	0	0	2	-2	7	25	2	4	0	1	0	0	7	75	6	3	0	0	3	-3	-3	-3	-3	
Consumption, Pulmonary.....	64	71	45	5	0	18	8	-8	57	93	52	5	0	20	1	-1	57	90	53	5	0	20	0	0	0	0	0	0
Croup, Membraneous.....	21	27	6	3	0	4	0	0	14	35	6	3	0	2	0	0	14	25	4	5	0	0	1	-1	-1	-1	-1	
Diphtheria.....	50	42	21	4	0	6	7	-7	36	55	20	6	1	1	7	-6	36	35	11	6	0	3	1	-1	-1	-1	-1	
Diarrhea.....	29	50	15	5	0	1	7	-7	36	50	19	4	0	2	8	-8	21	50	11	6	0	0	4	-4	-4	-4	-4	
Dysentery.....	7	80	6	4	0	0	4	-4	7	100	7	4	0	0	4	-4	14	75	11	5	0	0	4	-4	-4	-4	-4	
Erysipelas.....	50	39	19	4	0	8	5	-5	29	63	19	5	1	4	5	-4	29	41	13	6	0	4	0	0	0	0	0	
Fever, Intermittent.....	64	72	45	3	5	11	12	-7	64	71	46	3	3	8	12	-9	64	85	55	4	1	6	17	-16	-16	-16	-16	
Fever, Remittent.....	64	58	39	3	1	10	11	-10	71	66	46	4	3	10	8	-5	57	75	45	4	2	6	11	-9	-9	-9	-9	
Fever, Typhoid (Enteric).....	36	56	21	5	0	12	2	-2	21	42	9	5	0	1	3	-3	7	25	2	11	0	0	0	0	0	0	0	
Fever, Typho-malarial.....	21	40	9	4	1	4	1	0	14	63	9	3	0	2	2	-2	7	50	4	7	0	0	2	-2	-2	-2	-2	
Influenza.....	79	77	60	3	8	14	12	-4	71	76	54	3	6	15	4	+2	64	82	51	2	7	11	3	+4	+4	+4	+4	
Measles.....	14	50	6	4	0	4	0	0	7	75	6	2	1	2	0	+1	29	63	19	4	0	6	2	-2	-2	-2	-2	
Pneumonia.....	33	79	73	2	6	26	8	-2	86	80	69	3	2	19	10	-8	86	91	77	2	3	23	6	-3	-3	-3	-3	
Puerperal Fever.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	38	11	6	0	5	1	-1	-1	-1	-1	
Rheumatism.....	79	87	67	4	3	22	10	-7	93	72	67	3	1	16	12	-11	71	85	62	4	3	17	7	-4	-4	-4	-4	
Scarlatina.....	21	53	12	3	0	3	4	-4	7	67	4	5	0	0	2	-2	36	59	19	6	0	2	4	-4	-4	-4	-4	
Small-pox.....	21	43	9	5	0	0	1	-1	7	100	6	4	1	0	0	+1	7	100	8	3	0	1	1	-1	-1	-1	-1	
Whooping-cough.....	29	90	27	3	4	5	5	-1	36	75	28	3	4	2	7	-3	21	50	11	3	0	0	3	-3	-3	-3	-3	

a, b, c, d, e, f, g. For foot-notes and for unabbreviated headings, see first page of this table, page 254.
* For Number of Observers, Reports, Weeks in each Month, etc., see Exhibit 7, page 250.

a, b, c, d, e, f, g. For foot-notes and for unabbreviated headings, see first page of this list.
* For Number of Observers, Reports, Weeks in each Month, etc., see Exhibit 7, page 250.

Small-pox.....	8	50	4	3	0	0	1	-1	15	20	3	6	0	0	0	0	0	0	0	0	0	0	0
Whooping-cough.....	23	50	10	3	0	3	1	-1	46	40	18	3	0	8	1	-1	27	93	23	2	1	8	-2
AVERAGE FOR TABULATED DISEASES REPORTED PREVALENT.																							
Bronchitis.....	41	68	30	3.2	.6	8.8	4.3	-3.7	47	71	34	3.3	.9	11.9	5.2	-4.3	43	80	34	3.8	1.0	10.8	4.0
Cerebro-spinal Meningitis.....	38	67	24	3	0	3	8	-8	50	50	26	4	0	3	11	-11	62	81	50	5	2	14	9
Cholera Infantum.....	8	100	8	5	2	0	2	0	17	20	3	5	1	0	0	+1	8	25	2	5	0	1	0
Cholera Morbus.....	38	50	18	5	0	5	1	-1	58	82	47	4	6	16	3	+3	54	61	33	4	2	9	4
Consumption, Pulmonary.....	54	68	38	3	0	15	4	-4	75	73	57	4	0	22	8	-8	46	51	25	5	0	6	6
Croup, Membranous.....	62	80	48	5	0	19	4	-4	33	95	33	4	0	17	0	0	31	100	31	4	0	13	1
Croup, Membranous.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Diphtheria.....	8	100	8	4	1	2	1	0	17	20	3	6	1	0	1	0	23	50	12	7	0	5	1
Diarrhea.....	92	65	60	3	0	23	6	-6	92	91	83	2	1	33	12	-11	92	96	88	3	1	25	16
Dysentery.....	62	41	26	3	0	7	5	-5	100	67	67	3	0	18	14	-14	85	86	73	4	3	19	12
Erysipelas.....	31	81	26	5	1	6	6	-5	17	60	10	3	0	1	5	-5	15	50	8	6	0	2	1
Fever, Intermittent.....	100	100	100	1	3	37	4	-1	100	100	100	2	2	44	7	-5	100	100	100	1	2	38	4
Fever, Remittent.....	77	61	46	2	1	13	6	-5	92	81	81	3	2	28	12	-10	77	98	75	2	1	35	3
Fever, Typhoid (Enteric).....	0	0	0	0	0	0	0	0	33	67	21	4	3	7	1	+2	38	70	27	4	5	4	0
Fever, Typho-malarial.....	31	50	16	5	0	2	3	-3	33	55	19	4	1	5	0	+1	69	78	51	4	2	14	6
Influenza.....	23	100	20	3	0	4	4	-4	33	45	16	4	0	3	5	-5	38	70	27	5	0	6	4
Measles.....	23	58	14	5	0	5	2	-2	25	33	9	4	0	1	4	-4	8	25	2	2	0	0	1
Pneumonia.....	31	50	16	5	0	3	5	-5	17	70	12	4	1	5	1	0	8	100	8	3	0	3	1
Puerperal Fever.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	50	4	5	0	1	
Rheumatism.....	62	69	44	4	0	12	10	-10	67	55	36	5	0	15	5	-5	62	81	50	5	1	16	4
Scarlatina.....	15	63	10	3	0	0	5	-5	8	100	9	3	0	1	4	-4	8	100	8	3	0	0	4
Small-pox.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Whooping-cough.....	38	50	18	3	2	3	1	+1	33	70	24	3	0	8	6	-6	31	44	13	5	0	5	2

*TABLE

a, b, c, d, e, f. For foot-notes and for unabbreviated headings, see first page of this table, page 251.
 * For Number of Observers, Reports, Weeks in each Month, etc., see Exhibit 7, page 250.

Small-pox	25	100	25	13	0	4	3	-3	22	100	24	13	1	3	4	-3	22	100	22	10	2	3	3	-1
Whooping-cough	38	82	29	10	0	4	3	-3	33	83	29	10	0	6	3	-3	44	80	36	9	0	6	6	-6
JANUARY.																								
AV. for Tabulated Diseases Reported Prevalent.	47	74	35	4.9	1.3	9.8	5.3	-4.	43	80	35	5.4	1.1	9.3	4.8	-3.7	43	75	33	5.1	1.5	8.3	5.4	-3.9
Bronchitis.....	91	94	85	3	2	30	9	-7	92	98	90	2	6	29	7	-1	100	88	88	2	4	27	9	-5
Cerebro-spinal Meningitis...	0	0	0	0	0	0	0	0	25	42	10	9	0	3	1	-1	8	25	2	3	0	1	0	0
Cholera Infantum.....	9	20	2	3	0	0	1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cholera Morbus.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	25	4	3	0	0	2	-2
Consumption, Pulmonary...	73	78	56	4	3	25	0	+3	58	79	46	5	1	17	1	0	67	78	52	4	3	19	3	0
Croup, Membranous.....	27	53	15	7	0	6	2	-2	33	44	15	7	1	4	1	0	25	67	17	9	0	4	4	-4
Diphtheria.....	61	77	49	4	7	7	10	-3	50	79	40	6	1	7	8	-7	33	50	17	9	0	2	6	-6
Diarrhea.....	36	60	22	7	0	2	7	-7	33	81	27	6	0	4	8	-8	50	58	29	8	1	4	9	-8
Dysentery.....	18	60	11	14	0	1	5	-5	17	100	17	14	0	3	3	-3	25	58	15	12	1	2	4	-3
Erysipelas.....	45	76	35	7	0	8	7	-7	33	69	23	8	0	5	4	-4	33	81	27	8	0	7	6	-6
Fever, Intermittent.....	64	77	49	4	0	16	6	-6	58	82	48	4	2	14	5	-3	67	81	54	3	4	15	7	-3
Fever, Remittent.....	36	65	24	7	0	4	7	-7	25	83	21	8	0	4	5	-5	42	65	27	5	3	1	9	-6
Fever, Typhoid (Enteric)....	18	100	18	9	0	3	7	-7	17	42	10	8	0	0	4	-4	17	63	10	8	0	1	4	-4
Fever, Typho-malarial.....	27	93	25	9	0	3	6	-6	25	92	23	10	0	5	5	-5	25	83	21	10	2	2	5	-3
Influenza.....	82	67	55	3	4	19	4	0	92	84	77	3	4	25	6	-2	92	84	77	2	6	19	11	-5
Measles.....	18	70	13	8	0	4	0	0	17	63	10	14	0	2	2	-2	33	50	17	8	0	4	4	-4
Pneumonia.....	91	74	67	3	3	24	6	-3	83	73	60	4	2	17	8	-6	67	78	52	4	6	15	4	+2
Puerperal Fever.....	18	40	7	8	0	2	0	0	17	63	19	11	0	4	1	-1	8	50	4	12	0	2	0	0
Rheumatism.....	91	74	67	3	4	13	14	-10	83	93	77	3	4	19	12	-8	92	86	79	4	2	23	9	-7
Scarlatina.....	55	63	35	5	0	13	3	-3	42	75	31	4	0	7	5	-5	42	70	29	4	0	5	9	-9
Small-pox.....	18	100	18	7	2	5	2	0	17	100	17	11	0	4	3	-3	17	100	17	10	0	8	0	0
Whooping-cough.....	55	70	38	7	0	10	9	-9	50	92	46	7	1	12	7	-6	50	96	48	7	0	13	9	-9

JANUARY.

b, c, d, e, f, g. For foot-notes and for unabbreviated headings, see first page of this table, page 254.
For Number of Observers, Reports, Weeks in each Month, etc., see Exhibit 7, page 250.

Small-pox	17	100	17	8	1	5	0	+1	25	79	19	6	0	6	3	-3	20	88	18	5	0	2	2	-5
Whooping-cough.....	50	83	43	6	2	8	5	-3	58	85	48	6	0	18	8	-8	50	63	33	6	4	4	6	-2
AV. for Tabulated Diseases Reported Prevalent.	48	83	40	5.7	1	8.7	4.7	-3.7	48	84	40	5.4	2.4	11.4	4.8	-2.4	(51	81	41	5.5	2.0	10.4	4.5	-2.5
Bronchitis.....	50	90	45	7	0	9	8	-8	45	80	36	6	0	10	7	-7	55	83	45	5	1	10	6	-5
Cerebro-spinal Meningitis.....	0	0	0	0	0	0	0	0	9	20	2	6	0	1	0	0	0	0	0	0	0	0	0	
Cholera Infantum.....	50	60	30	5	1	6	5	-4	82	87	71	4	7	22	5	+2	55	75	41	7	3	6	6	-3
Cholera Morbus.....	80	78	63	4	0	6	7	-7	91	74	67	4	5	26	3	+2	73	66	48	5	0	11	6	-6
Consumption, Pulmonary.....	50	100	50	6	0	19	1	-1	55	90	49	6	0	22	2	-2	64	86	55	5	0	23	0	0
Croup, Membranous.....	10	100	10	18	1	3	1	0	18	50	9	13	0	4	1	-1	18	38	7	12	0	2	1	-1
Diphtheria.....	40	56	23	8	1	1	6	-5	27	60	16	9	0	3	6	-6	45	50	23	7	1	5	2	-1
Diarrhea.....	90	86	78	3	1	26	0	+1	100	93	95	2	5	39	2	+3	100	93	93	3	3	28	6	-3
Dysentery.....	70	68	48	5	1	11	5	-4	100	85	85	4	6	26	8	-2	91	73	66	4	2	19	5	-3
Erysipelas.....	20	88	18	15	0	3	4	-4	27	80	22	10	2	2	6	-4	18	88	16	14	0	3	4	4
Fever, Intermittent.....	100	100	100	2	7	21	8	-1	100	100	100	2	14	20	6	+8	100	100	100	1	9	26	5	+4
Fever, Remittent.....	70	79	55	4	0	15	6	-6	73	93	67	3	8	19	3	+5	82	97	80	3	12	18	1	+11
Fever, Typhoid (Enteric).....	20	100	20	9	0	4	4	-4	18	100	18	8	0	4	6	-6	36	69	23	6	0	5	4	-4
Fever, Typho-malarial.....	40	81	33	8	0	9	4	-4	45	76	35	7	1	9	6	-5	53	83	45	7	7	10	5	+2
Influenza.....	50	95	48	6	1	5	12	-11	27	73	20	8	0	3	6	-6	36	75	27	6	1	4	7	-6
Measles.....	20	63	13	9	0	5	0	0	9	100	9	12	0	2	0	0	9	100	9	10	0	4	0	0
Pneumonia.....	40	75	30	9	1	7	4	-3	27	60	16	10	0	2	5	-5	36	63	23	9	0	5	5	-5
Puerperal Fever.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rheumatism.....	50	89	49	7	0	10	5	-5	36	80	29	8	0	6	5	-5	64	82	52	6	1	15	5	-4
Scarlatina.....	30	83	25	9	0	4	6	-6	45	68	31	8	1	2	11	-10	36	81	30	7	0	6	7	-7
Small-pox.....	30	83	25	7	2	3	3	-1	18	100	18	15	0	2	5	-5	18	59	9	15	0	1	3	-3
Whooping-cough.....	50	85	43	7	4	7	4	0	45	92	42	7	2	6	8	-6	35	94	34	10	0	4	11	-11

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a, b, c, d, e, f. For foot-notes and for unabbreviated headings, see first page of this table, page 251.

* For Number of Observers, Reports, Weeks in each Month, etc., see Exhibit 7, page 250.

TABLE 3.—Exhibiting, by Localities and by Months, during the Year ending with September, 1877, Facts relative to the Occurrence and Order of Prevalence of Diseases in Michigan, as Compiled from Weekly Reports made by Health Officers of Cities, and by Regular Correspondents of this Board,—stating, for each Disease, the Per Cent of Weeks Reported Prevalent Where Prevalent, and the Average Order of Prevalence When Prevalent, thus indicating the Prevalence as regards Time, and also as regards Area, so far as this is represented by the localities. For the Four Weeks ending **October 28, 1876.**

DIVISIONS AND LOCALITIES REPRESENTED, AND PHYSICIANS WHO REPORTED.	Number of Reports received.		Bronchitis.		Cerebro-spinal Meningitis.	Cholera Infantum.	Cholera Morbus.	Consumption, Pulmonary.	Croup, Membranous.	Diphtheria.	Diarrhea.	Dysentery.	Erysipelas.	Fever, Intermittent.	Fever, Remittent.	Fever, Typhoid (Enteric).
	Per Cent of Weeks Prevalent.	Average Order of Prevalence.	Per Cent of Weeks Prevalent.	Average Order of Prevalence.	Per Cent of Weeks Prevalent.	Average Order of Prevalence.	Per Cent of Weeks Prevalent.	Average Order of Prevalence.	Per Cent of Weeks Prevalent.	Average Order of Prevalence.	Per Cent of Weeks Prevalent.	Average Order of Prevalence.	Per Cent of Weeks Prevalent.	Average Order of Prevalence.	Per Cent of Weeks Prevalent.	Average Order of Prevalence.
	4	5	6	5	6	5	6	5	6	5	6	5	6	5	6	5
ALL LOCALITIES.	108	80	4	38	5	33	6	5	3	68	74	4	5	62	4	4
UPPER PENINSULAR DIVISION.†	4	100	8			25	6				100	1	5			2
NORTH-WESTERN DIVISION.†	4	25	1	0	0	0	0	0	0	0	50	2	0	0	2	0
Frye Lake, H. T. Gurnis.																
NORTH-EASTERN DIVISION.†	4	0	0	0	0	0	0	0	0	0	100	5	5	75	3	4
Alpena, G. J. Shelton.											33	1	33	33	1	0
East Tawas, J. S. Reeves.																
WESTERN DIVISION.†	4	75	4	25	5	0	0	0	25	4	0	6	5	50	5	0
Grand Haven, Rev. L. M. S. Smith.																
Grand Rapids, J. B. Griswold.*																
Grand Rapids, A. Hazlewood.																
Lamont, J. C. McIlvay.																
CENTRAL DIVISION.†	4	100	6	0	0	25	0	0	0	100	6	4	25	0	100	5
Charlotte, R. B. Allen.																
Cormuna, J. P. Ceyran.																
DeWitt, G. W. Topping.																
Flint, A. B. Chapin.																
Hastings, C. Russell.																
Hubbardsston, H. W. Browne.																
Ionia, B. B. Thomas.																
Lyons, D. C. Spitting.																
N. Lansing, O. Marshall.																
BAY AND EASTERN DIVISION.†	4	50	3			50	4	50	4		75	4	25	6	100	4
Bay City, W. B. B.																
East Saginaw, H. B. Ross.																
Lapeer, A. A. Ash.*																
Port Huron, H. R. Mills.																
Port Huron, M. Northrup.																
Port Sanilac, J. M. Loop.																

(Health Officers in italics; those also Correspondents marked with a *.)

Saginaw City, N. D. Lee	4	100	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
West Bay City, I. E. Randall	4	100	5	0	0	25	6	75	7	50	100	6	0	0	0	5	100	6	50	4	100	8	100
SOUTH-WESTERN DIVISION.																							
Benton Harbor, John Bell	4	0	0	0	0	0	0	0	0	25	5	0	0	0	0	25	4	25	4	100	1	75	0
Edwardsburg, J. B. Sweetland	4	100	7	0	0	25	6	25	9	75	12	25	7	75	3	100	5	25	11	100	10	100	0
Osego, Milton Chase	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	3	0	0	100	2	75
Paw Paw, J. Andrews	4	0	0	0	0	25	2	0	0	0	0	0	0	0	0	0	25	3	0	0	100	0	100
SOUTHERN-CENTRAL DIVISION.																							
Albion, J. P. Stoddard	4	100	2	0	0	75	3	75	4	100	2	25	2	0	0	100	4	75	4	75	2	100	0
Blissfield, H. C. Wyman	2	100	6	0	0	0	0	0	50	5	100	2	50	1	0	0	0	0	0	0	0	100	0
Coldwater, L. H. Hurtz	4	100	3	0	0	25	5	100	5	50	9	0	25	8	50	7	25	9	0	0	100	0	
Marshall, H. L. Joy	4	100	2	0	0	0	0	25	2	75	3	0	0	0	0	25	2	0	0	0	100	0	
Mendon, E. Stewart	4	75	3	0	0	0	0	0	25	3	0	0	0	50	3	100	2	0	0	0	100	0	
Sturgis, N. I. Packard	2	0	0	0	0	0	0	0	0	0	0	0	0	50	3	0	0	0	0	0	100	0	
Tecumseh, C. M. Woodward	4	100	2	0	0	0	0	0	0	25	3	0	0	0	100	4	0	0	0	25	1	100	
Three Rivers, L. S. Stevens	4	25	3	0	0	0	0	0	0	25	4	0	0	50	3	0	0	25	2	0	6	100	
Xpsilanthi, E. Batwell*	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
SOUTH-EASTERN DIVISION.																							
Detroit, Leartus Connor	4	100	3	0	0	0	0	0	0	75	10	0	0	100	11	75	8	75	10	100	11	100	0
Detroit, W. H. Rouse	4	100	6	0	0	25	14	100	13	50	0	0	0	100	12	100	11	100	9	100	14	100	
Monroe, W. C. West	4	100	5	0	0	0	0	0	0	75	8	0	0	25	10	100	6	0	0	25	3	75	
Northville, J. M. Swift	4	75	1	0	0	0	0	0	0	0	0	25	1	50	2	0	0	0	50	3	0	100	
Pontiac, John P. Wilson	4	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Utica, Wm. Brownell	4	0	0	0	0	0	0	0	0	0	0	0	0	75	4	25	6	0	0	0	0	0	
Walled Lake, E. A. Chapman	4	33	4	0	0	0	0	0	0	0	0	67	4	0	0	67	3	0	0	0	100	1	
Wyandotte, E. P. Christian	4	50	1	—	—	—	—	—	—	—	—	—	—	25	3	75	3	—	—	—	—	—	

NOTE.—For comments on this table, see page 253.

* Health Officer and Correspondent. † For counties in each Division, see Exhibit 1, page 171.

† When less than the full number of reports for the month have been received from any Observer, the number against his name in the column "Per Cent of Weeks Prevalent", for any disease, is the per cent which the number of weeks he reports the disease present is of the number of cards received from him. When less than 2 reports have been received from any Observer for a month of 4 weeks, or less than 3 for a month of 5 weeks, they have not been compiled. When for any week no statement has been made by an Observer, with regard to a disease, and for the other weeks it has been marked 0, the columns for that disease against his name have been left blank. For the purposes of this compilation, each month is made to end on the Saturday nearest the end of the corresponding calendar month. In compiling this table, a fraction less than one-half is rejected, a fraction equal to or greater than one-half is counted as one.

§ The disease of which there were the most cases was to be marked 1 in order, on the cards; that of which there was the next greatest number, 2; and so on. Diseases not prevalent were to be marked 0.

[illegible]

The numbers in this line are statements not for all the localities represented, but for those in which the disease was reported present.

¶ Consumption, Remittent Fever, and Typho-malarial Fever were not printed on the first cards sent out, and probably for this reason they were not, during the first months of the year, so fully reported as they would otherwise have been.

TABLE 3.—Diseases, by Localities in Michigan, Four Weeks ending October 28, 1876.—CONTINUED.

DIVISIONS AND LOCALITIES REPRESENTED, AND PHYSICIANS WHO REPORTED.	Fever, Typho-malarial.		Influenza.		Measles.		Pneumonia.		Puerperal Fever.		Rheumatism.		Scarlatina.		Small-pox.		Whooping-cough.	DISEASES REPORTED, WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC.		Per Cent of Weeks Prevalent.	Av. Order of Prevalence when Prevalent.	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when Prevalent.
	Number of Reports received.	Per Cent of Weeks Prevalent.	Number of Reports received.	Per Cent of Weeks Prevalent.	Number of Reports received.	Per Cent of Weeks Prevalent.	Number of Reports received.	Per Cent of Weeks Prevalent.	Number of Reports received.	Per Cent of Weeks Prevalent.	Number of Reports received.	Per Cent of Weeks Prevalent.	Number of Reports received.	Per Cent of Weeks Prevalent.	Number of Reports received.	Per Cent of Weeks Prevalent.	Number of Reports received.						
ALL LOCALITIES.	168	53	4	72	6	71	5	62	25	2	72	4	61	6	100	13	74	7					
UPPER PENINSULAR DIVISION. †																							
Marquette, J. L. & Taylor.	1	25	2	100				73			100	3									25	6	
NORTH-WESTERN DIVISION. †																					73	1	
Frye Lake, H. T. Calkins.	4	0	0	0	0	0	0	0	0	0	25	3	0	0	0	0	0	0			73	1	
NORTH-EASTERN DIVISION. †																					100	4	
Alpena, G. J. Shelton.	4			50	0	0	50	4	25	5	100	3	0	0	0	0	0	0			50	4	
East Tawas, J. S. Reeves.	3		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			33	1	
WESTERN DIVISION. †																					100		
G'd Haven, Rev. L. M. S. Smith	4	0	0	100	3	0	73	4	0	0	75	5	0	0	0	0	0	0					
Grand Rapids, J. B. Griswold.*	3			100	67	5					67	4											
Grand Rapids, A. Hazlewood.	4			100	73	7					25	5											
Lamont, J. C. Melvin.	3			100																			
CENTRAL DIVISION. †																							
Charlotte, G. B. Allen.	4	50	5	100	3	0	25	8	0	0	100	6	50	9	0	0	50	10			73		
Corunna, J. D. Keegan.	4	25	3	100	0	0	0	0	0	0	0	0	73	12	0	0	0	0			25		
De Witt, G. W. Topping.	4	50	7	0	0	0	0	0	0	0	100	6	0	0	0	0	0	0			25		
Flint, A. B. Chapin.*	4	25	7	50	6	0	100	4	0	0	100	5	0	0	0	0	0	0			25		
Hastings, C. Russell.	3	100	4	0	0	0	67	6	0	0	67	5	0	0	0	0	0	0			50		
Hubbardsville, H. W. Browne.	4	25	4																		50		
Ionia, B. B. Thomas.	4	50	12								50	4									50		
Lyons, D. C. Spalding.	4	50	6																		50		
N. Lansing, O. Marshall.	4			25	4						50	3	25	1							50		
BAY AND EASTERN DIVISION. †																					73		
Bay City, W. H. Burr.	0	0	0	0	0	0	50	5	0	0	100	3	0	0	0	0	0	0			33	3	
East Saginaw, B. B. Ross.	2	100	3	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0			25		
Lapeer, A. Nash.	2			33	2						100	2	0	0	0	0	0	0			25		
Port Huron, H. E. Mills.	2	0	0	50	7	0	100	0	0	0	100	0	0	0	0	0	0	0			100		
Port Huron, J. M. Northrup.	2			73	7	0	67	0	0	0	0	0	0	0	0	0	0	0			100		
Port Sanilac, J. M. Loeb.	2			73	0	0	67	0	0	0	0	0	0	0	0	0	0	0			100		
Saginaw, J. D. Lee.	4	73	3	100	3	0	25	0	0	0	100	4	25	0							50	6	
Saginaw Bay City, L. E. Randall.	4	59	7	25	0	0	100	8	23	8	100	6	0	0	0	0	0	0			50	6	
WESTERN DIVISION. †																					25		
Benton Harbor, John Bell.	4	0	0	100	3	0	95	0	0	0	100	3	0	0	0	0	0	0			25		
Edwardsburgh, J. E. Sweetland.	4	100	5	100	4	0	100	0	0	0	13	0	100	8	0	0	0	0			25		
Oshtemo, Milton Chase.	4			95	6	0	100	3	0	0	23	2	100	2	0	0	0	0			100		
Paw Paw, J. Andrews.	4	0	0	73		0	50	0	0	0	100	4	0	0	0	0	0	0			25		

(Health Officers in italics; those also Correspondents marked with a *.)

SOUTHERN-CENTRAL DIVISION. †																											
Albion, J. P. Stoddard.....	4	25	3	100	1	0	0	100	3	0	0	0	0	0	0	0	0	0	0	25	3	25	s	Paralysis, several cases The children celebrate and are afflicted with marked cerebral symptoms and a tend- ency to a low form of fever--			
Blissfield, H. C. Wynum.....	4	50	4	50	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0		
Goldwater, L. H. Wroitz.....	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0		
Marshall, H. L. Joy.....	4	75	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0		
Mendon, E. Stewart.....	4	50	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Sturgis, N. I. Packard.....	4	50	3	50	2	0	0	25	3	0	0	100	3	0	0	0	0	0	0	0	0	0	0	0			
Tecumseh, C. M. Woodward.....	4	0	0	100	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Three Rivers, L. S. Stevens.....	4	0	0	75	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Ypsilanti, E. Hackett.....	4	25	2	0	0	0	0	50	4	0	0	0	0	0	0	0	0	0	0	25	2	100	0	t			
SOUTH-EASTERN DIVISION. †																											
Detroit, Leartus Connor.....	4	75	3	100	2	100	10	100	13	25	12	100	7	100	12	100	10	100	8	100	3	100	0	u	Pharyngitis..... Very little sickness.		
Detroit, W. H. Rouse.....	4	100	4	100	4	0	0	100	8	0	0	0	5	50	16	100	15	100	16	50	50	50	0			0	
Monroe, W. C. West.....	4	100	4	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0			
Northville, J. M. Swift.....	4	25	1	50	2	0	0	25	2	0	0	100	2	0	0	0	0	0	0	0	0	0	0	0			
Pontiac, John P. Wilson.....	4	0	0	50	3	0	0	0	0	0	0	0	25	5	0	0	0	0	0	0	0	0	0	0			
Utica, Wm. Brownell.....	4	50	2	100	3	0	0	50	5	0	0	100	4	0	0	0	0	0	0	0	0	0	0	0			
Walled Lake, E. A. Chapman.....	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	6	50	0	w	Very little sickness.		
Wyandotte, E. P. Christian.....	4	50	2	0	0	0	0	0	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0			0	

* Health Officer and Correspondent. † For counties in each Division, see Exhibit 1, page 171.

‡, §, ¶ For explanations of the methods of compiling this table, see foot-notes on page 297; for comments, see page 253.

** October 2, Dr. Chapin wrote: "Last year in conversation with Maj. P. D. Phillips, who is quite a sufferer with hay fever, and also in a recent interview, he attributed his complaint to *Rug Weed*, probably *Ambrosia Artemisiæfolia*, as being the principal cause. One year ago I gathered some by the wayside and observed that soon nasal secretion was developed, with sneezing. Have you any experience with the weed?"

a, b, c, etc. These letters refer across the page, from the names of Observers to statements concerning the amount of sickness, and relative to diseases reported by them in addition to those printed on the postal blanks.

TABLE 3.—CONTINUED.—Diseases, by Localities in Michigan, Four Weeks ending November 25, 1876.

DIVISIONS AND LOCALITIES REPRESENTED, AND PHYSICIANS WHO REPORTED.	Number of Reports received.	Bronchitis.		Cerebro-spinal Meningitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Comp. Membranous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric).	
		Per Cent of Weeks Prevalent.	Average when Prevalent.	Per Cent of Weeks Prevalent.	Average when Prevalent.	Per Cent of Weeks Prevalent.	Average when Prevalent.	Per Cent of Weeks Prevalent.	Average when Prevalent.	Per Cent of Weeks Prevalent.	Average when Prevalent.	Per Cent of Weeks Prevalent.	Average when Prevalent.	Per Cent of Weeks Prevalent.	Average when Prevalent.	Per Cent of Weeks Prevalent.	Average when Prevalent.	Per Cent of Weeks Prevalent.	Average when Prevalent.	Per Cent of Weeks Prevalent.	Average when Prevalent.	Per Cent of Weeks Prevalent.	Average when Prevalent.	Per Cent of Weeks Prevalent.	Average when Prevalent.	Per Cent of Weeks Prevalent.	Average when Prevalent.
ALL LOCALITIES ||	179	78	3	38	6	44	4	45	6	76	5	52	5	68	5	63	4	53	6	74	6	68	2	71	52	63	4
UPPER PENINSULAR DIVISION. †																											
Marquette, H. S. Tappan.	4	100		0	0	0	0	0	0	25	2	0	0	0	0	75	2	25	4	0	0	0	0	50	2	75	3
NORTH-WESTERN DIVISION. †																											
Fyfe Lake, H. T. Calkins.	4	75	2	0	0	0	0	0	0	0	0	0	0	0	0	25	1	0	0	0	0	25	2	0	0	0	0
NORTH-EASTERN DIVISION. †																											
Alpena, G. H. Shelton.	4	50	5	0	0	0	0	0	0	0	0	25	6	0	50	5	0	0	0	75	5	100	1	0	0	50	2
East Tawas, J. S. Reeves.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	1	25	1	0	0	0	0	0	0	0	0
WESTERN DIVISION. †																											
Grand Haven, Rev. L. M. S. Smith.	4	100	0	0	0	0	0	0	0	50	6	100	5	0	0	75	5	75	6	75	5	100	52	75	0	0	0
Grand Rapids, J. B. Griswold.*	2	100	5	0	0	0	0	0	0	100	7	0	100	5	0	0	0	0	0	0	0	0	100	13	100	0	0
Grand Rapids, A. Hazlewood.	4	25	3	25	4	0	0	0	0	100	4	25	7	25	4	0	0	0	0	0	0	0	100	3	100	0	0
Lamont, J. C. McIlwain.	3	67	3	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	33	12	100	1	100	3
Ludington, E. N. Duddass.	2	100	2	0	0	0	0	0	0	50	2	0	0	0	0	50	2	0	0	50	2	50	1	50	1	0	0
CENTRAL DIVISION. †																											
Charlotte, G. B. Allen.	4	100	5	0	0	0	0	0	0	75	10	0	0	100	6	100	4	25	11	12	100	2	75	13	100	8	
DeWitt, G. W. Topping.	2	100	0	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	100	4	0	100	13	100	0	
Flint, A. B. Chapin.	2	100	0	0	0	0	0	0	0	50	6	0	0	0	0	50	3	50	4	0	100	2	50	3	0	0	
Hastings, A. P. Drake.	4	100	5	0	0	0	0	0	0	100	6	0	0	75	6	50	4	0	0	0	0	100	1	0	0	0	
Hubbardston, H. W. Browne.	4	100	5	0	0	0	0	0	0	67	7	0	0	100	5	100	5	0	0	100	1	67	1	100	13	100	0
Isola, W. B. Thomas.	3	67	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	33	13	100	0	
Lansing, J. B. Hall.	2	50	3	0	0	50	5	0	0	25	6	25	5	0	0	25	8	0	0	0	0	100	2	50	4	0	0
Lyons, D. C. Spalding.	4	50	0	0	0	0	0	0	0	100	3	25	3	0	0	25	3	0	0	0	0	100	1	100	0	0	0
North Lansing, O. Marshall.	4	33	5	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	67	5	100	2	100	1	100	1
Ovid, C. V. Beebe.	3	33	5	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	1	100	2	100	0	0
BAY AND EASTERN DIVISION. †																											
Lapeer, A. Nash.*	4	100	2	0	0	25	2	25	2	25	2	100	2	100	2	100	2	25	2	100	2	100	2	25	2	0	0
Port Huron, H. R. Mills.	3	0	0	0	0	0	0	0	0	100	2	0	0	0	0	0	0	0	0	0	0	67	1	0	0	0	0
Saginaw City, A. D. Lee.	4	100	5	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0
Saginaw, J. M. Loop.	4	25	3	0	0	0	0	0	0	67	1	1	1	33	1	100	6	0	0	100	9	100	3	100	67	1	0
Thornville, J. S. Caulkins.	3	100	2	0	0	75	6	75	6	100	9	0	0	100	4	100	6	0	0	100	9	100	2	100	0	0	0
West Bay City, I. E. Randall.	4	100	2	0	0	0	0	0	0	67	1	1	1	33	1	100	6	0	0	100	9	100	2	100	0	0	0
SOUTH-WESTERN DIVISION. †																											
Beaumont Harbor, John Bell.	4	0	0	0	0	0	0	0	0	50	0	0	0	25	4	0	0	0	0	25	3	100	2	25	1	0	0
Edwardsburgh, J. B. Sweetland.	4	100	4	0	0	0	0	0	0	100	12	100	10	100	3	0	0	0	0	0	10	10	8	100	100	7	0
Otsego, Milton Chase.	4	25	2	0	0	0	0	0	0	25	4	0	0	0	0	50	3	0	0	50	2	75	2	25	0	0	0
Paw Paw, J. Andrews.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	2	100	1	75	0	0	0

(Health Officers in italics; those also Correspondents marked with a *.)

TABLE 3.—Diseases, by Localities in Michigan, Four Weeks ending November 25, 1876—CONTINUED.

DIVISIONS AND LOCALITIES REPRESENTED, AND PHYSICIANS WHO REPORTED.	Fever, Typho-malarial.		Influenza.		Measles.		Pneumonia.		Puerperal Fever.		Rheumatism.		Scarlatina.		Small-pox.		Whooping-cough.		DISEASES REPORTED, WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC.		Per Cent of Weeks Prevalent.	Av. Order of Prevalence when
	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when				
ALL LOCALITIES.—	179	70	82	10	100	6	63	4	33	8	81	4	60	5	100	13	77	7				
UPPER PENINSULAR DIVISION.—†	4	50	75	10	0	0	75	3	0	0	75	2	0	0	0	0	0	0			50	3
Marquette, J. S. Gifford.....a																					75	1
NORTH-EASTERN DIVISION.—†	4	0	0	0	0	0	0	0	0	0	25	2	0	0	0	0	0	0			50	1
Plymouth, H. W. Calkins.....b																					25	1
NORTH-EASTERN DIVISION.—†	4	25	0	0	0	0	100	5	0	0	100	4	25	5	0	0	0	0			55	1
Alpena, J. H. Sheldon.....c																					55	1
Eastport, J. S. Reeves.....c	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			55	1
W. Eastport, J. S. Reeves.....c	4	0	100	10	0	0	100	3	0	0	50	6	0	0	0	0	25	6			55	1
Old Iron, Rev. J. M. S. Smith.....d	4	50	100	4	100	4	25	0	0	0	50	6	0	0	0	100	7	7			75	1
Grand Rapids, J. H. Gifford.....e	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			55	1
Grand Rapids, A. Hazlewood.....e	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			55	1
Lamont, C. McIlvaine.....f	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			55	1
Ludington, E. N. Dundas.....f	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			75	1
GEORGETOWN DIVISION.—†	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			50	1
Charlotte, G. H. Allen.....g	4	100	5	0	0	0	100	10	50	13	100	7	0	0	0	0	0	0			50	1
De Witt, G. W. Topping.....g	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			55	1
Flint, A. B. Chapin.....h	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			55	1
Hastings, A. P. Drake.....h	4	50	100	0	0	0	25	5	0	0	100	3	100	6	0	0	0	0			50	3
Hubbardsburg, H. W. Browne.....i	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			50	3
Ironia, W. D. Thomas.....j	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			55	1
Laings, J. B. Hull.....j	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			55	1
Lyons, D. C. Spalding.....j	4	50	50	0	0	0	100	6	0	0	0	0	25	3	0	0	25	9			100	4
North, Lansing, O. Marshall.....k	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			75	4
Oriskany, C. V. Beebe.....k	4	100	1	0	0	0	67	2	0	0	100	2	100	2	0	0	67	4			100	4
BAY AND EASTERN DIVISION.—†	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			33	1
Lapeer, A. Nash.....l	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			33	1
Fort Huron, H. R. Mills.....l	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			33	1
Saginaw City, N. D. Lee.....l	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			33	1
Sanilac, J. M. Loop.....m	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			33	1
Thornville, J. S. Garkins.....n	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			33	1
South-Western DIVISION.—†	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			33	1
West Bay City, I. E. Randall.....o	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			33	1
Benton Harbor, John Bell.....p	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			33	1
Edwardsburgh, J. B. Sweetland.....p	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			33	1
Oshtemo, Milton Chase.....p	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			33	1
Paw Paw, J. Andrews.....q	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			33	1

(Health Officers in Italics; those also Correspondents marked with a *.)

a Pertinosis.
b { Neuralgia
 { Malarial Infection.
c { General depravity of system.
 { Pulmonary Hemorrhage.
d { Pulmonary congestion.
e { No sickness of any kind; persistent state of good health for last 6 weeks, Nov. 11.
f Mumps.
g Quinsy.
h Very healthy.
i No great prev. of any disease.
j Very little sickness.
k Pleuro-pneumonia.
l Acute ophthalmia.
m No new cases of whooping-cough, Nov. 4.
n Very little sickness.
o { Neuralgia.
 { Scarlet fever in country, 8 or 10 miles from Port Sanilac.
p No sickness in village.
q Very healthy.
r { Diphtheria is increasing in no. of cases.
 { Very little sickness. Influenza is prevalent, ending in capillary bronchitis in children, and bronchitis and pneumonia in adults; caused by the cold sticky weather of the past week. Much of it might have been avoided by

SOUTHERN-CENTRAL DIVISION.†														better shoes for children and by better ventilation of school-rooms.—Nov. 25.		The fevers are generally lapsing fevers, Nov. 11.	
Albion, J. P. Stoddard.....†	4	0	0	100	1	0	0	75	4	0	0	0	0	0	0	75	3
Ann Arbor, E. S. Dunster.....†	2	0	0	50	2	0	0	0	0	0	0	0	0	0	0	75	3
Blissfield, Hal C. Wyman.....†	4	75	4	0	0	0	0	50	5	0	0	0	0	0	0	100	3
Canton, A. W. Alvord.....†	4	50	7	0	0	0	0	25	4	0	0	0	0	0	0	100	3
Coldwater, L. H. Burtz.....†	4	0	0	100	2	0	0	100	3	0	0	0	0	0	0	100	3
Marshall, H. L. Joy.....†	4	50	6	0	4	0	0	100	3	0	0	0	0	0	0	100	3
Mendon, H. C. Clapp.....†	4	0	0	0	0	0	0	25	3	0	0	0	0	0	0	100	3
Mendon, Edwin Stewart.....†	3	100	2	0	0	0	0	33	5	0	0	0	0	0	0	100	3
Sturgis, N. I. Packard.....†	4	100	2	100	3	0	0	75	4	0	0	0	0	0	0	100	3
Three Rivers, L. S. Stevens.....†	4	100	1	100	5	0	0	0	0	0	0	0	0	0	0	100	3
Tecumseh, C. M. Woodward.....†	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	3
Ypsilanti, E. Edicell*.....†	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	3
SOUTH-EASTERN DIVISION.†														Dis. at its minimum, Nov. 18.		Typhoid fever is obstinate with severe cerebral symp-	
Detroit, Leartus Connor.....†	4	50	10	75	7	100	12	100	13	0	0	100	9	100	12	50	50
Detroit, W. H. Rouse.....†	4	100	7	100	3	0	0	100	5	25	17	100	16	100	15	50	50
Millford, Robert Johnston.....†	4	0	0	100	0	0	0	0	0	0	0	0	0	0	0	50	50
Monroe, W. C. West.....†	4	50	7	0	0	0	0	0	0	0	0	100	6	0	0	50	50
Northville, J. M. Swift.....†	2	0	0	50	0	0	0	50	3	0	0	100	2	0	0	50	50
Pontiac, J. P. Wilson.....†	4	0	0	100	2	0	0	100	4	0	0	0	0	0	0	50	50
Trifect, Wm. Brownell.....†	4	0	0	100	1	0	0	0	0	0	0	100	3	0	0	50	50
Walled Lake, E. A. Chapman.....†	4	0	0	0	0	0	0	25	3	0	0	100	2	0	0	50	50
Wyandotte, E. T. Christian.....†	4	0	0	0	0	0	0	25	2	0	0	50	0	0	0	50	50

* Health Officer and Correspondent. † For counties in each Division, see Exhibit 1, page 171.

‡, §, ||, ¶ For explanations of the methods of compiling this table, see foot-notes on page 297; for comments, see page 253.

** Mild, cloudy, and misty, 3 weeks.

a, b, c, etc. These letters refer across the page, from the names of Observers, to statements concerning the amount of sickness, and relative to diseases reported by them in addition to those printed on the postal blanks.

TABLE 3.—CONTINUED.—Diseases, by Localities in Michigan, Five Weeks ending **December 30, 1876.**

[illegible]

[illegible]

* Health Officer and Correspondent.

[†] For counties in each Division, see Exhibit 1, page 171.

t. §. II. ¶ For explanations of the methods of compiling this table, see foot-notes on page 297; for comments, see page 253.

NOTE.—N. I. Packard, M. D., of Sturgis, wrote, Dec. 26: "I reported Typhoid Fever a month ago. We had only 6 cases. Three (in one family) were imported from the vicinity of Kalamazoo. The other 3 occurred in two houses *near* the imported cases, but no intercourse or any possible way of communication of the disease could, by the most careful inquiry, be established. By careful management, the disease has been stamped out here."

Dec. 12, Dr. L. H. Wurtz of Coldwater, reported Small-pox in Mattison, Branch Co., brought there by a gentleman from the State of New York. Many of the neighbors were immediately vaccinated, and the disease was confined to one family.

TABLE 3.—Diseases, by Localities in Michigan, Five Weeks ending December 30, 1876.—CONTINUED.

DIVISIONS AND LOCALITIES REPRESENTED, AND PHYSICIANS WHO REPORTED.	Fever, Typho- malaria, &c.		Influen- za.		Measles.		Pneumo- nia.		Puert- al Fever.		Rheuma- tism.		Scarlati- na.		Small- pox.		Whoop- ing- cough.		DISEASES REPORTED, WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICK- NESS, ETC.	Per Cent of Weeks Preva- lent.	A. V. Order of Prevalence When
	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.					
ALL LOCALITIES.—	80	4	83	80	80	80	80	47	72	4	61	4	100	10	68	6					
UPPER-PENINSULAR DIVISION:†	5	20	4	100	0	0	0	0	0	0	100	5	0	0	0	0			Tonsillitis	2	
Marquette, Geo. J. Northrop.	5	0	4	100	0	0	0	0	0	0	100	5	0	0	0	0			Pleurisy	40	
Marquette, H. S. Taff.	5	0	0	100	0	0	0	0	0	0	100	4	0	0	0	0			Peritonitis	20	
NORTH WESTERN DIVISION:†	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			Peritonitis	20	
Fyfe Lake, H. T. Calkins.	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			Pleuritis	20	
NORTH-EASTERN DIVISION:†	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			Pleuritis	20	
Alpena, G. H. Shelton.	5	0	40	0	0	0	0	0	0	0	100	3	0	0	0	0			Anemia	20	
East Tawas, J. S. Reeves.	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			Malarial infection*	20	
WESTERN DIVISION:†	5	0	0	100	100	100	100	0	0	0	100	4	0	0	0	0			Neuralgia	20	
G. Haven, Rev. L. M. S. Smith.	5	0	100	100	100	100	100	0	0	0	100	4	0	0	0	0			No great prevalence of any disease.	60	
Grand Rapids, J. B. Griswold.†	5	0	100	100	100	100	100	0	0	0	100	4	0	0	0	0			Very little sickness.	20	
G. Rapids, Arthur Hazlewood.†	5	0	100	100	100	100	100	0	0	0	100	4	0	0	0	0			Parotiditis	20	
Lamont, J. C. McVain.	5	0	100	100	100	100	100	0	0	0	100	4	0	0	0	0			Catarhal fever.	20	
CENTRAL DIVISION:†	5	100	3	100	0	0	100	40	12	8	0	0	0	0	60	12			Group, spasmodic.	25	
Charlottesville, G. B. Allen.	5	100	4	100	0	0	100	40	11	7	0	0	0	0	40	11			Pulmonary derangements	25	
Charlottesville, R. W. Shriver (Rec.).	5	0	0	100	0	0	50	0	0	3	75	1	0	0	25	3			Increasing, Dec. 16.	40	
Corunna, J. D. Kegan.	5	0	0	100	0	0	100	0	0	0	0	0	0	0	0	0			Little sickness.	100	
De Witt, G. W. Topping.	5	0	0	100	0	0	100	0	0	0	0	0	0	0	0	0			No sickness.	40	
Hastings, A. P. Drake.	5	0	0	100	0	0	100	0	0	0	0	0	0	0	0	0			Common cold.	20	
Hubbardsston, H. W. Browne.	5	0	0	100	0	0	100	0	0	0	0	0	0	0	0	0			Pleurisy	20	
Lausling, J. B. Hull.	5	0	0	100	0	0	100	0	0	0	40	2	0	0	0	0			New cases of whooping-	20	
Lyons, D. C. Spalding.	5	0	0	100	0	0	100	0	0	0	100	4	0	0	0	0			cough, Dec. 16 and 23.	20	
North Lansing, O. Marshall.	5	0	0	100	0	0	100	0	0	0	30	4	0	0	0	0			Pneumonia increasing, Dec. 9.	40	
Ovid, C. V. Beebe.	5	100	2	100	0	0	80	20	4	3	0	0	0	0	80	2			Very little sickness.	100	
BAY AND EASTERN DIVISION:†	5	60	4	100	1	0	100	0	0	0	0	0	0	0	60	2			Neurlogia.	40	
Lapeer, Alfred Nash.	5	0	0	100	0	0	100	0	0	0	0	0	0	0	0	0			Inflammation of mucous	40	
Port Huron, H. R. Mills.	5	0	0	100	0	0	100	0	0	0	0	0	0	0	0	0			surfaces prevails, Dec. 2.	100	
Saginaw City, N. D. Lee.	5	0	0	100	0	0	80	0	0	0	0	0	0	0	0	0			Very healthy from Nov. 1	40	
Saukier, J. M. Loop.	5	0	0	100	0	0	100	0	0	0	20	1	0	0	0	0			to Dec. 21.	40	
Thornville, J. E. Calkins.	5	0	0	100	0	0	100	0	0	0	0	0	0	0	100	2			Mild sore throat, several	20	
West Bay City, L. E. Randall.	5	0	0	100	1	0	100	0	0	0	80	7	0	0	100	0			cases.	80	
SOUTH-WESTERN DIVISION:†	5	0	0	100	0	0	100	0	0	0	25	2	0	0	75	4			Very little sickness.	40	
Allegan, H. F. Thomas.	5	0	0	100	0	0	100	0	0	0	0	0	0	0	0	0			Many children sick with	40	
Benton Harbor, John Bell.	5	0	0	100	0	0	100	0	0	0	100	5	0	0	100	10			lung troubles, Dec. 30.	40	
Edwardsburgh, J. B. Sweetland.	5	20	8	100	0	0	100	0	0	0	100	5	0	0	100	0			Number of mild cases of	40	
Otsego, Milton Chase.	5	0	80	100	0	0	100	0	0	0	11	0	0	0	100	0			sore throat, Dec. 9.	40	

(Health Officers in Italics; those also Correspondents marked with a *.)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221	1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TABLE 3.—CONTINUED.—Diseases by Localities in Michigan, Five Weeks ending February 3, 1877.

DIVISIONS AND LOCALITIES REPRESENTED, AND PHYSICIANS WHO REPORTED.	Number of Reports received.	Bronchitis.		Cerebro-Spinal Meningitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric).				
		Per Cent of Weeks Prevalent.	Ay. Order of Prevalence when Prev.	Per Cent of Weeks Prevalent.	Ay. Order of Prevalence when Prev.	Per Cent of Weeks Prevalent.	Ay. Order of Prevalence when Prev.	Per Cent of Weeks Prevalent.	Ay. Order of Prevalence when Prev.	Per Cent of Weeks Prevalent.	Ay. Order of Prevalence when Prev.	Per Cent of Weeks Prevalent.	Ay. Order of Prevalence when Prev.	Per Cent of Weeks Prevalent.	Ay. Order of Prevalence when Prev.	Per Cent of Weeks Prevalent.	Ay. Order of Prevalence when Prev.	Per Cent of Weeks Prevalent.	Ay. Order of Prevalence when Prev.	Per Cent of Weeks Prevalent.	Ay. Order of Prevalence when Prev.	Per Cent of Weeks Prevalent.	Ay. Order of Prevalence when Prev.	Per Cent of Weeks Prevalent.	Ay. Order of Prevalence when Prev.			
ALL LOCALITIES ||.....	325	90	10	50	9	20	10	30	5	77	5	31	5	65	4	55	5	63	8	52	5	63	4	56	4	64	6	
UPPER-PENINSULAR DIVISION: †																												
Calumet, C. W. Niles.....	5	60	4	0	0	0	0	0	0	0	0	0	0	0	0	40	4	0	0	60	5	0	0	0	0	0	0	0
Marquette, H. S. Taylor.....	5	100	1	0	0	0	0	0	0	0	0	0	0	0	0	80	4	0	0	50	6	20	5	0	0	0	0	
Marquette, G. J. Northrop.....	5	100	2	50	5	0	0	0	0	20	5	20	6	0	0	0	0	0	0	20	6	20	5	0	0	0	0	
NORTH-WESTERN DIVISION: †																												
Fyfe Lake, H. T. Calkins.....	5	60	1	0	0	0	0	40	2	0	0	0	0	0	0	40	2	0	0	0	0	20	2	20	2	0	0	
Manistee, W. F. Fisher.....	5	80	3	0	0	0	0	0	0	80	6	20	3	20	6	5	0	0	0	20	6	0	0	20	7	0	0	
NORTH-EASTERN DIVISION: †																												
Albion, G. H. Shelton.....	5	40	0	0	0	0	0	0	0	40	3	40	4	0	0	20	3	0	0	20	4	60	2	0	0	0	0	
East Tawas, J. S. Reeves.....	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
WESTERN DIVISION: †																												
Evart, D. L. Dumont.....	4	50	4	0	0	0	0	0	0	100	7	0	0	0	0	0	0	0	100	5	50	4	0	0	0	0	0	
Grand Haven, Rev. L. M. S. Smith.....	5	100	5	0	0	0	0	40	5	100	5	40	6	0	0	100	4	100	5	60	5	100	3	80	0	0	0	
Grand Rapids, J. B. Griswold*.....	5	60	5	0	0	0	0	0	0	20	6	0	0	0	0	60	4	0	0	20	5	40	6	60	5	0	0	
Grand Rapids, Arthur Hazlewood.....	5	100	5	0	0	0	0	0	0	100	5	20	5	20	5	0	0	0	0	0	0	100	4	20	4	0	0	
Lamont, J. C. McIlvaine.....	5	100	5	0	0	0	0	0	0	100	2	0	0	0	0	0	0	0	0	0	0	100	3	20	3	0	0	
Ludington, E. N. Dundass.....	5	60	1	0	0	0	0	0	0	0	0	60	2	0	0	0	0	0	0	0	0	0	60	2	0	0	0	
Ludington, P. P. Shortt.....	5	100	2	0	0	0	0	0	0	20	16	60	3	20	4	80	3	0	0	100	2	80	3	20	4	0	0	
CENTRAL DIVISION: †																												
Charlotte, G. B. Allen.....	5	100	1	0	0	0	0	0	0	100	10	0	0	0	0	100	4	0	0	20	13	100	7	100	6	80	9	
Charlotte, R. W. Shriver (Recorder).....	5	100	2	0	0	0	0	0	0	100	0	0	0	0	0	100	4	0	0	0	100	7	80	8	80	8		
DeWitt, G. W. Topping.....	5	100	4	0	0	0	0	0	0	100	5	0	0	0	0	100	4	0	0	60	7	100	6	0	0	0	0	
Flint, A. B. Chapin.....	3	100	4	0	0	0	0	0	0	33	9	100	4	67	7	33	9	100	7	67	4	100	4	33	1	0	0	
Goodrich, C. V. Beebe.....	4	75	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	1	0	0	0	0	
Hastings, A. P. Drake.....	5	100	3	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	100	5	0	0	0	0	
Hastings, C. Russell.....	5	0	0	0	0	0	0	0	0	20	6	60	3	100	3	0	0	0	0	0	60	3	100	2	20	3		
Hastings, Wm. Upham.....	5	200	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	
Hulbardston, H. W. Browne.....	5	80	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	5	0	0	0	0	0	
Ionia, Wm. B. Thomas.....	4	25	1	0	0	0	0	0	0	0	0	0	0	0	0	100	7	0	0	20	5	100	1	50	1	0	0	
Lansing, J. B. Hull.....	5	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	
Lansing, G. E. Ranney.....	5	0	0	0	0	0	0	40	8	20	6	0	0	0	0	0	0	0	0	0	40	2	0	0	0	0	0	
Lyons, D. C. Spalding.....	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
North Lansing, O. Marshall.....	5	100	1	0	0	0	0	0	0	100	4	20	4	20	3	20	5	0	0	0	0	80	3	0	0	0	0	0
Owosso, C. P. Hill.....	5	100	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
BAY AND EASTERN DIVISION: †																												
Lapeer, A. Nash.....	5	100	2	0	0	0	0	0	0	60	2	100	3	100	2	0	0	40	5	100	3	100	3	40	5	0	0	0

DIVISIONS AND LOCALITIES REPRESENTED, AND PHYSICIANS WHO REPORTED.

(Health Officers in italics; those also Correspondents marked with a *.)

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* Health Officer and Correspondent. † For counties in each Division, see Exhibit I, page 171.

†, §, || For explanations of the methods of compiling this table, see foot-notes on page 297; for comments, see page 253.

¶ Dr. Shorts wrote (Jan. 27): "Pulmonary Consumption is a rare disease in this locality, and is seldom, if ever, contracted here except by those who are strongly predisposed previously to coming here."

**** Dr. Northrup says that the deaths from Consumption in 1876 were 15 per cent of the whole number of deaths.**

NOTE.—John Tatman, M. D., Health Officer of Muskegon, wrote, Jan. 23: "We are just now having quite an epidemic of Scarlatina, Mumps, and Erysipelas."

D. W. C. Burch, M. D., of Rockford, wrote, Feb. 3, "Diphtheria is gradually subsiding."

TABLE 3.—Diseases, by Localities in Michigan, Five Weeks ending February 3, 1877—CONTINUED.

DIVISIONS AND LOCALITIES REPRESENTED, AND PHYSICIANS WHO REPORTED.		Number of Reports received.		Fever, Typho- mari- al.		Influen- za.		Measles.		Pneumo- nia.		Puerper- al Fever.		Rheuma- tism.		Scarlati- na.		Small- pox.		Whoop- ing- cough.		DISEASES REPORTED, WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICK- NESS, ETC.		Per Cent of Weeks Prova- lent.		A. V. Order of Prevalence when Prevalent.		
ALL LOCALITIES.		325	6	77	5	55	80	23	4	64	3	63	6	66	6	66	6	66	6	66	6	66	6	66	6	66	6	66
UPPER-PENINSULAR DIVISION. †																												
Calumet, C. W. Niles		5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marquette, H. S. Taft		5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Marquette, Geo. J. Northrop.		5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
NORTH-WESTERN DIVISION. †																												
Ft. Lake, H. T. Calkins		5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Manistee, W. F. Fisher		5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
NORTH-EASTERN DIVISION. †																												
Alpena, G. H. Shelton		5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
East Tawas, J. S. Reeves		5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
WESTERN DIVISION. †																												
Evart, Osceola Co., D. L. Dunton		4	100	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
G'ld Haven, Rev. L. N. Smith		5	40	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Grand Rapids, J. B. Griswold*		5	40	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Grand Rapids, A. Hazlewood		5	40	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Lamont, J. C. McIvay		5	40	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ludington, E. N. Dundass		5	40	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ludington, P. P. Short*		5	40	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
CENTRAL DIVISION. †																												
Charlotte, G. B. Allen		5	80	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Charlotte, R. H. Sharrier (Recorder)		5	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
De Witt, G. W. Topping		5	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Flint, A. B. Chapin		3	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Goodrich, C. V. Beebe		4	0	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Hastings, A. P. Drake		5	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Hastings, C. Russell		5	80	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Hastings, Wm. Uphoff		5	80	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Hubbardston, H. W. Browne		5	80	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ironia, Wm. B. Thomas		5	40	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Lansing, J. B. Hull		4	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Lansing, G. E. Ranney		5	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Lyons, D. C. Spalding		5	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
North Lansing, O. Marshall		5	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Owosso, C. P. Hill		5	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
BAY AND EASTERN DIVISION. †																												
Lapeer, A. Nash*		5	20	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

(Health Officers in italics; those also
Correspondents marked with a *)

[illegible]

* Health Officer and Correspondent. † For counties in each Division, see Exhibit I, page 171.

†, §, || For explanations of the methods of compiling this table, see foot-notes on page 297; for comments, see page 253.

a, b, c, etc. These letters refer across the page from the names of Observers to statements concerning the amount

sickness, and relative to diseases reported by them in addition to those printed on the postal blanks.

NOTE.—Jan. 20, E. N. Dundass, M. D., of Ludington, wrote: "Plenty of Small-pox at Manistee, 30 miles north of us."

Dr. Wurtz, of Coldwater, reported "on good authority" that Small-pox was communicated from one family to another, in Batavia, Branch Co., in January. The articles of clothing given away.

TABLE 3—CONTINUED.—Diseases, by Localities in Michigan, Four Weeks ending March 3, 1877.

DIVISIONS AND LOCALITIES REPRESENTED, SENTED, AND PHYSICIANS WHO REPORTED.																									
(Health Officers in italics; those also Correspondents marked with a *)																									
ALL LOCALITIES //																									
UPPER-PENINSULAR DIVISION. †																									
Calumet, C. W. Niles.	4	100	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marquette, H. S. Taft.	4	100	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marquette, G. J. Northrop.	4	100	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NORTH-WESTERN DIVISION. †																									
Fyfe Lake, H. T. Calkins.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NORTH-EASTERN DIVISION. †																									
Alpena, G. H. Shelton.	4	25	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Tawas, J. S. Reeves.	4	25	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WESTERN DIVISION. †																									
Cannonsburgh, C. L. Chamberlin.	3	33	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Evart, D. L. Dumon.	3	67	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Haven, A. Vander Veer.	4	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Rapids, J. R. Griswold.	3	100	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Rapids, Arthur Hazlewood.	4	75	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lamont, J. C. McIlvain.	4	100	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ludington, P. P. Shurtis.	4	100	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ludington, E. N. Dundass.	4	25	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rockford, D. W. C. Eurch.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CENTRAL DIVISION. †																									
Charlotte, G. B. Allen.	3	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Charlotte, R. H. Shriver (Recorder).	4	100	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
De Witt, G. W. Topping.	4	100	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodrich, C. V. Beebe.	4	100	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Greenville, W. Doctman.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hastings, A. P. Drake.	4	100	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hastings, William Uphol.	4	25	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hubbardston, H. W. Browne.	4	25	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ionia, Wm. B. Thomas.	4	100	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lansing, J. W. Taggart.	4	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lansing, G. E. Ranney.	4	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lyons, D. C. Spalding.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N. Lansing, O. Marshall.	4	100	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ovid, O. E. Campbell.	4	25	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BAY AND EASTERN DIVISION. †																									
Lapeer, A. Nash.	4	100	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(Health Officers in Italics; those also Correspondents marked with a *.)

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* Health Officer and Correspondent.

ties in each Division, see Exhibit 1, page 171.

†. §. || For explanations of the methods of compiling this table, see foot-notes on page 297; for comments, see page 253.

NOTE.—A case of Small-pox was reported by the Clerk of Calvin township, Cass Co., Feb. 10, 1877. Feb. 20 R. G. Healey, M. D., wrote: "About 24 cases of Small-pox have been reported to the board of health of Paris township, Huron Co." Feb. 6, T. H. Laverty, M. D., Health Officer of Fairfield township, Lenawee Co., reported Small-pox in that and adjoining townships, said to have been sent out from the House of Correction at Detroit.

[illegible]

* Health Officer and Correspondent.

4. §. || For explanations of the methods of compiling this table, see foot-notes on page 297; for comments, see page 253.

† Dr. Shortt says that adjacent to marbles the scarlatina assumes a malignant form in five-eighths of the cases, and about two-eighths have diphtheritic pharyngitis.

a, b, c, etc. These letters refer across the page, from the names of Observers to statements concerning the amount of sickness, and relative to diseases reported by them in addition to those printed on the postal blanks.

TABLE 3.—CONTINUED.—Diseases, by Localities in Michigan, Four Weeks ending March 31, 1877.

DIVISIONS AND LOCALITIES REPRESENTED, AND PHYSICIANS WHO REPORTED.	Number of Reports received.	Bronchitis.		Cerebro-spinal Meningitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membranous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric).	
		Per Cent of Weeks Prevalent.	Average when Prevalent.	Per Cent of Weeks Prevalent.	Average when Prevalent.	Per Cent of Weeks Prevalent.	Average when Prevalent.	Per Cent of Weeks Prevalent.	Average when Prevalent.	Per Cent of Weeks Prevalent.	Average when Prevalent.	Per Cent of Weeks Prevalent.	Average when Prevalent.	Per Cent of Weeks Prevalent.	Average when Prevalent.	Per Cent of Weeks Prevalent.	Average when Prevalent.	Per Cent of Weeks Prevalent.	Average when Prevalent.	Per Cent of Weeks Prevalent.	Average when Prevalent.	Per Cent of Weeks Prevalent.	Average when Prevalent.	Per Cent of Weeks Prevalent.	Average when Prevalent.	Per Cent of Weeks Prevalent.	Average when Prevalent.
ALL LOCALITIES.	207	80	44	5	38	50	4	38	5	80	5	41	6	58	6	56	5	53	8	52	6	81	52	61	4	73	2
UPPER-PENINSULAR DIVISION. †																											
Calumet, C. W. Niles.	4	75	4																								
Marquette, J. S. Taft.	4	100		0	100																						
Marquette, Geo. J. Northrop.	4	100		0	0	0																					
NORTH-WESTERN DIVISION. †																											
Fyfe Lake, H. T. Cairns.	4	25	1	0	0	0																					
NORTH-EASTERN DIVISION. †																											
Alpena, G. H. Shelton.	4	0	0	0	0	0																					
East Tawas, J. S. Reeves.	4	25	1																								
WESTERN DIVISION. †																											
Cannonsburg, C. L. Chamberlin.	4	0	25	4																							
Evart, D. L. Dunon.	4	50	0	0																							
Grand Haven, A. Vander Veer.	4	100	4																								
Grand Rapids, J. E. Griswold.*	4	25	3																								
Grand Rapids, Arthur Hazlewood.	4	100	25	5																							
Laumont, J. C. McIlvian.	4	100	1																								
Ludington, P. Short.	4	100	1	0	0	0																					
Ludington, E. N. Dundass.	4	50	1	0	0	0																					
Rockford, D. W. C. Burch.	4	0	0	0	0	0																					
CENTRAL DIVISION. †																											
Charlotte, G. B. Allen.	4	100	0	0	0	0																					
Charlotte, R. W. Sharver (Recorder).	4	100	1	0	0	0																					
DeWitt, G. W. Topping.	4	100	1	0	0	0																					
Hastings, William Cyprien.	4	25	1	0	0	0																					
Hastings, A. P. Drake.	4	75	0	0	0	0																					
Hubbardston, H. W. Browne.	4	75	0	0	0	0																					
Ionia, Wm. B. Thomas.	4	75	0	0	0	0																					
Lansing, J. W. Hagalorn.	4	50	0	0	0	0																					
Lansing, J. B. Hull.	4	25	1	0	0	0																					
Lansing, G. E. Ranney.	4	100	1	0	0	0																					
N. Lansing, O. Marshall.	4	100	0	0	0	0																					
Ontonagon, D. C. Spalding.	4	0	0	0	0	0																					
Ovid, O. Campbell.	4	0	0	0	0	0																					
PORT AND EASTERN DIVISION. †																											
Aspen, A. J. Josselyn.	4	100	5	0	0	0																					
Port Huron, H. R. Mills.	4	75	2	0	0	0																					

(Health Officers in italics; those also Correspondents marked with a *.)

[illegible]

* Health Officer and Correspondent.

[†], §, || For explanations of the methods of compiling this table, see foot notes on page 297; for comments, see page 253.

NOTE.—March 13, a letter was received from H. A. Haigh, stating that there had been 12 or 13 cases of Small-pox in township of Dearborn, Wayne Co., and that the disease seemed to be spreading.

TABLE 3.—Diseases, by Localities in Michigan, Four Weeks ending March 31, 1877—CONTINUED.

DIVISIONS AND LOCALITIES REPRESENTED, AND PHYSICIANS WHO REPORTED.	Fever, Typho- malari- al.		Influen- za.		Measles.		Pneumo- nia.		Typhero- al Fever.		Rheuma- tism.		Scarlati- na.		Small- pox.		Whoop- ing- cough.		DISEASES REPORTED, WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICK- NESS, ETC.		Per Cent of Weeks Preva- lent.	Av. Order of Prevalence when Prevalent.
	Number of Reports received.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.	Per Cent of Weeks Prevalent.				
ALL LOCALITIES.	267	61	84	2	57	6	78	5	35	6	79	4	64	5	100	1	89	4			100	1
UPPER-PENINSULAR DIVISION.	4																				75	3
Calumet, C. W. Niles.			100	5			25	7			100	5	100	4			100	1				
Marquette, H. S. Tait.			100	1	0	0	25	4	55	2	100	3	50	3	0	0	0	0				
Marquette, Geo. J. Northrop.			100	0	0	0	25	1	25	1	0	0	0	0	0	0	0	0			25	1
North-Western Division.	4	0	0	0	0	0	25	1	25	1	0	0	0	0	0	0	0	0			50	50
Pfe Lake, H. T. Calkins.			100	0	0	0	25	1	25	1	0	0	0	0	0	0	0	0			50	50
North-Eastern Division.	4	0	0	0	0	0	50	2	0	0	0	0	0	0	0	0	0	0			25	25
Alpena, G. H. Shelton.			100	0	0	0	50	2	0	0	0	0	0	0	0	0	0	0			50	50
East Tawas, J. S. Reeves.			100	0	0	0	50	2	0	0	0	0	0	0	0	0	0	0			50	50
WESTERN DIVISION.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			50	50
Cannonsburg, C. L. Chamberlin.			100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			50	50
Evart, D. L. Dunton.			100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			50	50
Grand Haven, A. Vander Veer.			100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			50	50
Grand Rapids, J. B. Griswold.			100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			50	50
Grand Rapids, A. Hazlewood.			100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			50	50
Lamont, J. C. McIlvaine.			100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			50	50
Ludington, P. P. Short.			100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			50	50
Ludington, E. N. Dumtass.			100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			50	50
Rockford, D. W. C. Barclay.			100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			50	50
CENTRAL DIVISION.	4	50	6	100	4	0	100	4	25	11	100	5	0	0	0	0	0	0			75	1
Charlotte, G. B. Allen.			100	0	0	0	100	4	25	11	100	5	0	0	0	0	0	0			75	1
Charlotte, R. W. Shriver (Recorder).			100	0	0	0	100	4	25	11	100	5	0	0	0	0	0	0			75	1
De Witt, G. W. Topping.			100	0	0	0	100	4	25	11	100	5	0	0	0	0	0	0			75	1
Hastings, William Upjohn.			100	0	0	0	100	4	25	11	100	5	0	0	0	0	0	0			75	1
Hastings, A. P. Drake.			100	0	0	0	100	4	25	11	100	5	0	0	0	0	0	0			75	1
Humboldt, H. W. Browne.			100	0	0	0	100	4	25	11	100	5	0	0	0	0	0	0			75	1
Ionia, W. B. Thomas.			100	0	0	0	100	4	25	11	100	5	0	0	0	0	0	0			75	1
Lansing, J. W. Ungert.			100	0	0	0	100	4	25	11	100	5	0	0	0	0	0	0			75	1
Lansing, J. B. Hull.			100	0	0	0	100	4	25	11	100	5	0	0	0	0	0	0			75	1
Lansing, G. B. Ranney.			100	0	0	0	100	4	25	11	100	5	0	0	0	0	0	0			75	1
North Lansing, G. Marshall.			100	0	0	0	100	4	25	11	100	5	0	0	0	0	0	0			75	1
Ontonagon, D. C. Spalding.			100	0	0	0	100	4	25	11	100	5	0	0	0	0	0	0			75	1
Otsego, D. Campbell.			100	0	0	0	100	4	25	11	100	5	0	0	0	0	0	0			75	1
Bay and Eastern Division.	4	75	6	100	1	0	100	3	0	0	100	3	0	0	0	0	0	0			75	3
Lapeer, A. Averbach.			100	0	0	0	100	3	0	0	100	3	0	0	0	0	0	0			75	3
Port Huron, H. R. Mills.			100	0	0	0	100	3	0	0	100	3	0	0	0	0	0	0			75	3

[illegible]

* Health Officer and Correspondent. † For counties in each Division, see Exhibit 1, page 171.

[†], §, || For explanations of the methods of compiling this table, see foot-notes on page 297; for comments, see page 253.

Off Cold, with snow, 3 weeks. Pleasant, week ending March 31.

a, b, c, etc. These letters refer across the page, from the names of Observers to statements concerning the amount of sickness, and relative to diseases reported by them in addition to those printed on the postal blanks.

NOTE.—A case of Scarlet Fever at Burr Oak was reported by the Township Clerk, March 5.

[illegible]

* Health Officer and Correspondent. † For counties in each Division, see Exhibit 1, page 171.

†, §, || For explanations of the methods of compiling this table, see foot-notes on page 297; for comments, see page 253.

Mostly pleasant, 4 weeks. Rainy and chilly, latter part of week ending April 28.

a, b, c, etc. These letters refer across the page, from the names of Observers to statements concerning the amount of sickness, and relative to diseases reported by them in addition to those printed on the postal blanks.

NOTE.—April 13, S. P. Danfield, M. D., of Dearborn, reported five cases of Small-pox in one family in Ecorse township, Wayne Co. April 19, Dr. Wurtz, of Coldwater, reported five cases of Small-pox in Quincy, Branch Co., saying that it was claimed that the disease was brought there in the clothing of a tramp.

SOUTH-WESTERN DIVISION.†									
Benton Harbor, J. Bell.....	5	0	0	0	0	0	0	0	0
Matawan, Thos. H. Briggs.....	3	0	0	0	0	0	0	0	0
Niles, Simeon Belknap.....	2	0	0	0	0	0	0	0	0
Osage, Milton Chase.....	2	0	0	0	0	0	0	0	0
Paw Paw, J. Andrews.....	5	20	0	0	0	0	0	0	0
St. Joseph, R. F. Stratton.....	5	20	0	0	0	0	0	0	0
SOUTHERN-CENTRAL DIVISION. †									
Albion, J. P. Stoddard.....	5	100	0	0	60	4	100	4	100
Ann Arbor, W. F. Breakey.....	5	20	0	0	0	0	0	0	0
Brooklyn, E. N. Palmer.....	5	20	4	0	0	0	0	0	0
Clinton, A. W. Alvord.....	5	100	0	0	0	0	0	0	0
Coltwater, L. H. Wartz*.....	5	80	0	0	0	0	0	0	0
Kalamazoo, W. B. Southard.....	5	60	4	0	0	0	0	0	0
Mendon, H. C. Clapp.....	5	100	4	0	0	0	0	0	0
Mendon, E. twin Stewart.....	5	40	4	0	0	0	0	0	0
Murgis, N. L. Packard.....	5	40	0	0	0	0	0	0	0
Tecumseh, C. M. Woodward.....	5	40	0	0	0	0	0	0	0
Three Rivers, L. S. Stevens.....	5	0	0	0	0	0	0	0	0
York, F. M. Oakley.....	5	60	0	0	0	0	0	0	0
Ypsilanti, E. Battrell*.....	5	60	0	0	0	0	0	0	0
SOUTH-EASTERN DIVISION.†									
Detroit, Learius Connor.....	4	100	0	0	0	0	0	0	0
Detroit, W. H. Rouse.....	5	100	20	20	0	0	0	0	0
Midford, Robert Johnston.....	5	100	0	0	0	0	0	0	0
Monroe, A. J. Sawyer.....	5	100	0	0	0	0	0	0	0
Monroe, W. C. West.....	5	20	0	0	0	0	0	0	0
Northville, J. M. Swift.....	5	40	0	0	0	0	0	0	0
Pontiac, J. P. Wilson.....	5	0	0	0	0	0	0	0	0
Utrac, Wm. Brownell.....	5	0	0	0	0	0	0	0	0
Wayne, Ira W. Fletcher.....	5	60	4	0	0	0	0	0	0
Wayne, E. P. Christian.....	5	40	0	0	0	0	0	0	0
Windsor, E. P. Christian.....	5	100	5	20	3	0	0	0	0
Windsor, E. J. Langlois.....	4	50	0	0	0	0	0	0	0

* Health Officer and Correspondent.

+ For counties in each Division, see Exhibit 1, page 171.

* § 11 For explanations of the methods of compiling this table, see foot-notes on page 297; for comments, see page 253.

NOTE.—I. M. Loon, M. D., of Port Sanilac, reported that from May 6 to July 14 "there were no diseases worth speaking of."

SOUTH-WESTERN DIVISION. †																																					
Benton Harbor, John Bell.....	5	0	0	20	4	0	80	3	0	100	3	20	5	0	0	0	0	0	60																		
Mattawan, Thos. H. Briggs.....	5	0	0	33	2	100	1	0	0	0	0	67	2	0	0	0	0	0	80																		
Niles, Simon Belknap.....	5	0	0	0	0	0	0	0	0	0	80	5	80	1	0	0	0	0	20																		
Oasego, Milton Chase.....	5	0	0	60	3	0	0	0	0	40	4	60	3	0	0	0	0	0	40																		
Paw Paw, J. Andrews.....	5	0	0	20	1	0	0	0	0	60	1	0	0	0	0	0	0	0	20																		
St. Joseph, R. F. Stratton.....	5	0	0	0	60	1	0	0	0	60	5	40	6	0	0	0	0	0	40																		
SOUTHERN CENTRAL DIVISION. †																																					
Albion, J. P. Stoddard.....	5	0	0	100	1	20	4	103	2	0	100	2	100	1	0	0	0	0	20																		
Ann Arbor, W. F. Breakley.....	5	0	0	20	1	0	40	2	0	60	4	0	0	0	0	0	0	0	20																		
Brooklyn, E. N. Palmer.....	5	40	4	0	0	0	0	0	0	60	3	0	0	0	0	0	0	0	20																		
Canton, A. W. Alvord.....	5	80	6	20	1	0	0	40	7	0	100	3	60	3	0	0	0	0	20																		
Coldwater, L. H. Wurts.....	5	0	0	0	0	0	0	20	4	0	80	0	0	0	0	0	0	0	20																		
Kalamazoo, W. B. Southard.....	5	0	0	0	0	0	0	60	2	0	100	3	40	4	0	0	0	0	20																		
Mendon, H. C. Clapp.....	5	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	20																		
Mendon, Edwin Stewart.....	5	0	0	0	0	0	0	100	2	0	60	0	0	0	0	0	0	0	20																		
Sturgis, N. I. Packard.....	5	0	0	40	4	0	0	60	4	0	0	0	0	0	0	0	0	0	20																		
Tecumseh, C. M. Woodward.....	5	20	0	0	0	0	0	0	0	40	0	0	0	0	0	0	0	0	20																		
Three Rivers, L. S. Stevens.....	5	0	0	40	3	100	2	0	0	0	100	3	0	0	0	0	0	0	20																		
York, F. M. Oakley.....	5	0	0	0	0	0	0	80	3	0	100	3	0	0	0	0	0	0	20																		
Ypsilanti, Edward Edwells.....	5	20	3	20	4	60	3	0	0	0	0	0	0	0	0	0	0	0	20																		
SOUTH-EASTERN DIVISION. †																																					
Detroit, Leartus Connor.....	4	100	8	75	8	100	8	100	10	25	15	100	6	100	4	100	9	100	11																		
Detroit, W. H. Rouse.....	5	100	13	100	3	60	16	100	5	0	0	100	8	100	8	100	7	100	15																		
Milford, Robert Johnston.....	5	0	0	80	3	0	0	0	0	0	40	4	0	0	0	0	0	0	3																		
Monroe, A. J. Sargent.....	5	100	4	100	2	100	6	100	4	80	6	100	2	100	7	0	0	100	6																		
Monroe, W. C. West.....	5	0	0	0	0	0	0	0	0	0	60	3	0	0	0	0	0	0	3																		
Northville, J. M. Swift.....	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3																		
Pontiac, J. P. Wilson.....	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3																		
Utica, Wm. Brownell.....	5	0	0	100	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3																		
Walled Lake, E. A. Chapman.....	5	0	0	60	2	0	0	20	5	0	0	0	0	0	0	0	0	0	3																		
Wayne, I. W. Fletcher.....	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3																		
Wyandotte, E. P. Christian.....	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3																		
Wyandotte, T. J. Langlots.....	4	0	0	0	0	0	0	50	5	0	0	20	2	5	0	0	0	100	1																		
																		100	2																		
																		80	3																		

* Health Officer and Correspondent.

† For counties in each Division, see Exhibit 1, page 171.

‡, §, || For explanations of the methods of compiling this table, see foot-notes on page 237; for comments, see page 253.

¶ Cold winds, 2 weeks ending May 12. Dry, warm, and dusty, June 2.

a, b, c, etc. These letters refer across the page, from the names of Observers to statements concerning the amount of sickness, and relative to diseases reported by them in addition to those printed on the postal blanks.

NOTE.—May 29, R. H. Reed, M. D., Health Officer of Grant township, Keweenaw Co., reported that there had been for some months, in that township, a severe epidemic of Whooping-cough and Measles, with one death from Whooping-cough.

TABLE 3.—CONTINUED.—Diseases, by Localities in Michigan, Four Weeks ending June 30, 1877.

DIVISIONS AND LOCALITIES REPRESENTED, AND PHYSICIANS WHO REPORTED.	Number of Reports received.	Bronchitis.		Cerebro-spinal Meningitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric).	
		Per Cent of Weeks		Per Cent of Weeks		Per Cent of Weeks		Per Cent of Weeks		Per Cent of Weeks		Per Cent of Weeks		Per Cent of Weeks		Per Cent of Weeks		Per Cent of Weeks		Per Cent of Weeks		Per Cent of Weeks		Per Cent of Weeks	
		Av. Order of Prevalence	Av. Order of Prevalence when Prev.	Av. Order of Prevalence	Av. Order of Prevalence when Prev.	Av. Order of Prevalence	Av. Order of Prevalence when Prev.	Av. Order of Prevalence	Av. Order of Prevalence when Prev.	Av. Order of Prevalence	Av. Order of Prevalence when Prev.	Av. Order of Prevalence	Av. Order of Prevalence when Prev.	Av. Order of Prevalence	Av. Order of Prevalence when Prev.	Av. Order of Prevalence	Av. Order of Prevalence when Prev.	Av. Order of Prevalence	Av. Order of Prevalence when Prev.	Av. Order of Prevalence	Av. Order of Prevalence when Prev.	Av. Order of Prevalence	Av. Order of Prevalence when Prev.	Av. Order of Prevalence	Av. Order of Prevalence when Prev.
ALL LOCALITIES ||	222	68	4	45	6	42	5	46	3	82	4	50	10	53	5	47	5	60	5	93	1	71	15	89	6
UPPER PENINSULAR DIVISION. †																									
Marquette, H. S. Tift.	4	100	6																						
NORTH-WESTERN DIVISION. †																									
Fyfe Lake, H. T. Calkins.	4	0	0	0	0	25	1	25	1	0	0	0	0	0	25	1	0	0	0	25	1	25	1	0	0
NORTH-EASTERN DIVISION. †																									
Alpena, Wm. P. Maiden.	4	75	2	0	0	25	3	0	0	25	4	0	0	0	25	1	0	0	0	0	0	25	3	0	0
WESTERN DIVISION. †																									
Grand Haven, A. Vander Veer.	4	25	8			75	5	50	6	25	5														
Grand Rapids, Arthur Hazlewood.	4																								
Holland, B. Ledebor.	4	25	3			25	2	50	9	100	5														
Lamont, J. C. Melvin.	4																								
Rockford, D. W. C. Burch.	4																								
CENTRAL DIVISION. †																									
Charlotte, G. E. Allen.	4	100	5	0	0	25	9	0	0	100	9	0	0	0	100	3	0	0	0	100	1	75	1	0	0
De Witt, G. W. Topping.	4	25	0	0	0	0	0	0	0	0	0	0	0	0	0	25	3	0	0	100	1	100	1	0	0
Hastings, A. P. Drake.	4	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	0	0	0	100	1	0	0	0	0
Howell, C. V. Beebe.	4	0	0	0	0	0	0	0	0	75	4	0	0	0	0	0	0	0	0	75	1	50	0	0	0
Rubur, Ison, H. W. Browne.	4																								
Ionia, Wm. B. Thomas.	4																								
Lansing, J. B. Hull.	4	50	3									25	7												
Lyons, D. C. Spalding.	4																								
N. Lansing, O. Marshall.	4	75	3	0	0	0	0	0	0	100	2	0	0	0	25	3	0	0	0	100	1	0	0	0	0
Ogenville, A. W. Nicholson.	4	0	0	0	0	0	0	0	0	25	4	0	0	0	0	0	0	0	0	100	1	25	3	0	0
Ovid, O. B. Campbell.	4	0	0	0	0	0	0	0	0	75	3	0	0	0	0	0	0	0	0	25	1	50	1	0	0
BAY AND EASTERN DIVISION. †																									
Bay City, W. H. Burr.	4	0	0	0	0	100	4	50	5	100	6	0	0	0	100	4	75	7	0	100	1	100	2	0	0
Lapeer, A. N. Ish.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	25	4	0	0
Port Huron, H. R. Mills.	4	0	0	0	0	25	4	25	3	75	0	0	0	0	25	5	0	0	75	6	100	1	0	0	0
Port Huron, J. Northup.	4																								
Saginaw City, N. D. Lee.	4	100	3	0	0	0	0	0	0	100	4	0	0	0	100	3	50	5	0	100	1	100	3	0	0
Thornville, J. S. Caulkins.	4	100	3	0	0	0	0	0	0	100	6	50	7	0	0	0	25	3	6	100	1	100	3	0	0
West Bay City, I. E. Randall.	4	25	5	0	0	50	4	100	4	100	6	0	0	0	25	4	0	0	100	5	100	1	0	0	0
SOUTH-WESTERN DIVISION. †																									
Benton Harbor, John Bell.	4	0	0	0	0	25	4	25	3	100	3	0	0	0	25	2	0	0	0	100	1	0	0	0	0
Matawan, Thos. H. Briggs.	4	2	0	0	0	0	0	0	0	0	0	0	0	0	75	4	0	0	50	1	50	1	0	0	0
Niles, Simeon Belknap.	4	0	0																						

(Health Officers in italics; those also Cor-
respondents marked with a *.)

TABLE 3.—Diseases, by Localities in Michigan, Four Weeks ending June 30, 1877—CONTINUED.

DIVISIONS AND LOCALITIES REPRESENTED, AND PHYSICIANS WHO REPORTED.	Fever, Typho- malan- tal.										DISEASES REPORTED, WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICK- NESS, ETC.										Per Cent of Weeks Preva- lent +	Av. Order of Prevalence when Prevalent §
	Number of Reports received.																					
	Per Cent of Weeks Prevalent +	Av. Order of Preva- lence when Prev §	Per Cent of Weeks Prevalent +	Av. Order of Preva- lence when Prev §	Measles, Per Cent of Weeks Prevalent +	Av. Order of Preva- lence when Prev §	Pneumo- nia, Per Cent of Weeks Prevalent +	Av. Order of Preva- lence when Prev §	Pericper- al Fever, Per Cent of Weeks Prevalent +	Av. Order of Preva- lence when Prev §	Rheuma- tism, Per Cent of Weeks Prevalent +	Av. Order of Preva- lence when Prev §	Scarlati- na, Per Cent of Weeks Prevalent +	Av. Order of Preva- lence when Prev §	Small- pox, Per Cent of Weeks Prevalent +	Av. Order of Preva- lence when Prev §	Whoop- ing- cough, Per Cent of Weeks Prevalent +	Av. Order of Preva- lence when Prev §				
ALL LOCALITIES.....	222	71	51	62	69	4	70	5	63	4	50	4	92	4	72	4						
UPPER-PENINSULAR DIVISION. †	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—						
Marquette, H. & Taff.	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—						
NORTH-WESTERN DIVISION. †	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Fyfe Lake, H. T. Calkins.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
NORTH-EASTERN DIVISION. †	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Alpena, Wm. P. Marden.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
WESTERN DIVISION. †	4	50	3	4	50	6	100	4	50	6	100	4	—	—	—	—						
Grand Haven, A. Vander Veegh.	4	50	3	4	50	6	100	4	50	6	100	4	—	—	—	—						
Grand Rapids, A. Hazlewood. †	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—						
Holland, B. Ledebor.	4	25	50	—	—	—	—	—	—	—	—	—	—	—	—	—						
Lamont, J. C. McIvan.	4	75	—	—	—	—	—	—	—	—	—	—	—	—	—	—						
Rockford, D. W. C. Burch.	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—						
CENTRAL DIVISION. †	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Charlotte, G. E. Allen.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
De Witt, G. W. Topping.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Hastings, A. P. Drake.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Howell, C. V. Beebe.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Hubbardsville, H. W. Browne.	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—						
Ironia, Wm. B. Thomas.	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—						
Lansing, J. B. Hull.	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—						
Lyons, D. C. Spalding.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
N. Lansing, O. Marshall.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Otisville, A. W. Nicholson.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Ovid, O. B. Campbell.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
BAY AND EASTERN DIVISION. †	4	25	7	0	0	0	0	0	0	0	0	0	0	0	0	0						
Bay City, W. H. Burr.	4	100	4	0	0	0	0	0	0	0	0	0	0	0	0	0						
Lapeer, A. Nash.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Port Huron, H. R. Mills.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Port Huron, M. Northup.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Saginaw City, N. D. Lee.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Thornville, John S. Caultkins.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
West Bay City, L. E. Randall.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
SOUTH-WESTERN DIVISION. †	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Penton Harbor, John Bell.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Mattawan, Thos. H. Briggs.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Niles, Simeon Belknap.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						

(Health Officers in Italics; those also
Correspondents marked with a *.)

Case	Age	Sex	Occupation	Onset	Duration	Course	Result	Remarks
Osgood, Milton Chase	4	0	0	0	0	0	0	Very little sickness, 2 weeks ending June 30.
Paw Paw, J. Andrews	4	0	0	0	0	0	0	Mumps, epidemic.
St. Joseph, R. F. Stratton	4	0	0	0	0	0	0	Generally healthy, June 30.
SOUTHERN CENTRAL DIVISION.†								
Albion, John P. Stoddard	4	0	0	0	0	0	0	Gastro-enteritis
Ann Arbor, W. F. Brakey	4	0	0	0	0	0	0	Rheumatism is of malarial origin, June 16.
Brooklyn, E. N. Palmer	4	0	0	0	0	0	0	Very healthy, 3 weeks ending June 30.
Clinton, A. W. Alvord	4	0	0	0	0	0	0	Very little sickness, 3 weeks ending June 23. Bowel dis-
Coldwater, Louis H. Wurtz	4	0	0	0	0	0	0	eases becoming frequent, June 30. Frost in morning of June 25 and 23.
Deerfield, N. D. Yale	4	0	0	0	0	0	0	Chicken-pox, "prevalent" in Rotheln.
Kalamazoo, W. B. Southard	4	0	0	0	0	0	0	Still healthy, June 9. Malarial type to everything, 3 weeks ending June 30. Wet weather, June 30.
Marshall, H. L. Joy	4	0	0	0	0	0	0	Indigestion
Mendon, H. C. Clapp	4	0	0	0	0	0	0	
Mendon, Edwin Stewart	4	0	0	0	0	0	0	
Sturgis, Nelson I. Packard	4	0	0	0	0	0	0	
Tecumseh, C. M. Woodward	4	0	0	0	0	0	0	
Three Rivers, L. S. Stevens	4	0	0	0	0	0	0	
York, F. M. Oakley	4	0	0	0	0	0	0	
Ypsilanti, Edward Battell*	4	0	0	0	0	0	0	
SOUTH EASTERN DIVISION.†								
Detroit, W. H. Rouse	4	0	0	0	0	0	0	
Millford, Robert Johnson	4	0	0	0	0	0	0	
Monroe, Edward Dorsch	4	0	0	0	0	0	0	
Monroe, Wm. C. West	4	0	0	0	0	0	0	
Northville, J. M. Swift	4	0	0	0	0	0	0	
Pontiac, John P. Wilson	4	0	0	0	0	0	0	
Utica, Wm. Brownell	4	0	0	0	0	0	0	
Walled Lake, E. A. Chapman	4	0	0	0	0	0	0	
Wayne, Ira W. Fletcher	4	0	0	0	0	0	0	
Wyandotte, E. P. Christian	4	0	0	0	0	0	0	

* Health Officer and Correspondent. † For counties in each Division, see Exhibit I, page 171.

* , § , || For explanations of the methods of compiling this table, see foot-notes on page 297; for comments, see page 253.

* First part of week ending June 16, raw and wet. Pleasant, June 23.

a, b, c, etc. Those letters refer across the page, from the names of Observers to statements concerning the amount of sickness, and relative to diseases reported by them in addition to those printed on the postal blanks.

NOTE.—July 1, George J. Ambrose, Clerk of Alletton village, Newaygo Co., reported details of 33 cases of Measles and 26 of Scarlet Fever, including four deaths from Scarlet Fever, occurring in said village from April 1 to June 6.

TABLE 3.—CONTINUED.—Diseases, by Localities in Michigan, Four Weeks ending July 28, 1877.

DIVISIONS AND LOCALITIES REPRESENTED, AND PHYSICIANS WHO REPORTED.	Number of Reports received.	Bronchitis.			Cerebro-spinal Meningitis.			Cholera Infantum.			Cholera Morbus.			Consumption Pulmonary.			Croup, Membranous.			Diphtheria.			Diarrhea.			Dysentery.			Erysipelas.			Fever, Intermittent.			Fever, Remittent.			Fever, Typhoid (Enteric).																																																																																																																																																																																																																																																																																																																																																																																						
		Per Cent of Weeks.			Per Cent of Weeks.			Per Cent of Weeks.			Per Cent of Weeks.			Per Cent of Weeks.			Per Cent of Weeks.			Per Cent of Weeks.			Per Cent of Weeks.			Per Cent of Weeks.			Per Cent of Weeks.			Per Cent of Weeks.			Per Cent of Weeks.			Per Cent of Weeks.																																																																																																																																																																																																																																																																																																																																																																																						
		Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.	Prevalent.	Av. Order of Prevalence when Prev.	Prevalent.

(Health officers in italics; those also Correspondents marked with a *.)

Niles, Simeon Belknap.....	4	0	0	0	0	100	4	100	6	75	8	0	0	0	0	100	2	75	5	50	5	100	5	100	0	0
Osago, Milton Chase.....	4	0	0	0	0	25	2	75	3	0	0	0	0	25	3	50	3	0	0	25	3	100	2	100	0	0
Paw Paw, J. Andrews.....	4	0	0	0	0	100	2	100	2	100	2	0	0	0	0	0	100	1	100	3	100	1	100	0	0	
SOUTHERN-CENTRAL DIVISION. †																										
Albion, John P. Stoddard.....	4	100	2	0	0	100	2	100	2	100	2	0	0	0	0	0	100	4	100	3	100	2	100	0	0	
Blissfield, Hal C. Wyman.....	2	50	3	0	0	50	4	0	0	50	6	0	0	0	0	0	0	0	25	4	0	0	100	0	0	
Brooklyn, E. N. Palmer.....	4	25	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	5	100	9	100	0	0	
Canton, E. N. Palmer.....	4	0	100	5	50	10	0	0	0	100	8	0	0	0	0	0	0	0	100	3	100	1	100	0	0	
Clinton, A. W. Alford.....	4	0	0	0	0	3	75	2	25	5	0	0	0	0	0	0	0	0	75	4	0	1	100	0	0	
Coldwater, L. H. Wartz *.....	4	100	3	0	0	25	0	0	0	100	4	75	0	0	0	0	0	0	25	4	0	0	100	1	0	
Kalamazoo, W. B. Southard.....	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	100	0	0	
Kalamazoo, W. B. Southard.....	4	50	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	100	0	0	
Mendon, H. C. Clapp.....	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	1	0	0	100	0	0	
Mendon, Edwin Steward.....	4	0	0	0	0	0	0	75	4	100	4	0	0	0	0	0	0	0	50	3	0	1	100	0	0	
Sturgis, N. I. Packard.....	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	3	0	1	100	0	0	
Tecumseh, C. M. Woodward.....	4	0	0	0	0	0	0	50	3	0	0	0	0	0	0	0	0	0	100	3	100	1	100	0	0	
Three Rivers, L. S. Stevens.....	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	3	100	3	100	0	0	
York, F. M. Oakley.....	4	0	0	0	0	0	0	75	3	100	3	0	0	0	0	0	0	0	25	3	100	1	25	0	0	
Ypsilanti, E. B. Howell *.....	4	0	0	0	25	4	0	0	0	0	0	0	0	0	0	0	0	0	25	3	100	1	25	0	0	
SOUTHEASTERN DIVISION. †																										
Detroit, Leartus Connor.....	4	100	10	0	0	50	5	100	5	100	9	0	0	0	0	0	0	4	75	4	100	4	100	0	0	
Detroit, W. H. Rouse.....	4	100	11	0	0	100	4	100	5	100	8	100	18	100	17	100	16	3	100	8	100	3	100	0	11	
Milford, Robt. Johnston.....	4	100	4	0	0	0	50	0	0	0	0	0	0	0	0	0	0	1	0	0	1	100	0	0		
Monroe, Edward Dorsch.....	4	100	5	0	0	100	3	100	4	100	4	0	0	75	6	100	0	1	0	5	1	100	0	0		
Northville, J. M. Swift.....	4	0	0	0	0	25	3	0	0	0	0	0	0	0	0	0	0	1	100	1	100	1	100	6		
Pontiac, John P. Wilson.....	4	0	0	0	0	0	25	3	0	0	0	0	0	0	0	0	0	0	0	0	1	100	0	0		
Utica, Wm. Brownell.....	4	0	0	0	0	25	8	100	3	100	5	0	0	0	0	0	0	0	6	0	1	100	0	0		
Walled Lake, E. A. Chapman.....	4	0	0	0	0	0	0	0	0	0	0	0	0	25	3	25	5	0	4	0	0	100	0	0		
Wayne, Ira W. Fletcher.....	4	0	0	0	0	25	3	0	0	100	2	0	0	0	0	0	0	0	0	0	1	100	0	0		
Wyandotte, E. P. Christian.....	4	50	3	0	0	0	75	3	0	0	0	0	0	25	5	50	4	0	50	4	0	100	0	0		

* Health Officer and Correspondent. † For counties in each Division, see Exhibit 1, page 171.

+, §, || For explanations of the methods of compiling this table, see foot-notes on page 297; for comments, see page 253.

NOTE.—July 16, R. G. Healy, M. D., Health Officer of Paris township, Huron Co., reported an epidemic of Small-pox, in which there were 24 cases (with 2 deaths) up to Feb. 19, and about 11 cases after that date. The disease was spread by certain Poles, "regardless of the orders of the Board of Health," thronging the house where the first case occurred, after her death, January 7.

July 17, a case of Cerebro-spinal Meningitis was reported by Dr. W. T. McHench, of Brighton.

TABLE 3.—Diseases, by Localities in Michigan, Four Weeks ending July 28, 1877—CONTINUED.

DIVISIONS AND LOCALITIES REPORTED, AND PHYSICIANS WHO REPORTED.	Fever, Typho- malari- al.		Influen- za.		Measles.		Pneumo- nia.		Puerper- al Fever.		Rheuma- tism.		Scarlati- na.		Small- pox.		Whoop- ing- cough.		DISEASES REPORTED, WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICK- NESS, ETC.		Per Cent of Weeks Preva- lence when Prevalence when	Per Cent of Weeks Preva- lence when Prevalence when	Av. Order of Prevalence when	Av. Order of Prevalence when
	Per Cent of Weeks Prevalence when	Av. Order of Prevalence when	Per Cent of Weeks Prevalence when	Av. Order of Prevalence when	Per Cent of Weeks Prevalence when	Av. Order of Prevalence when	Per Cent of Weeks Prevalence when	Av. Order of Prevalence when	Per Cent of Weeks Prevalence when	Av. Order of Prevalence when	Per Cent of Weeks Prevalence when	Av. Order of Prevalence when	Per Cent of Weeks Prevalence when	Av. Order of Prevalence when	Per Cent of Weeks Prevalence when	Av. Order of Prevalence when	Per Cent of Weeks Prevalence when	Av. Order of Prevalence when						
ALL LOCALITIES ||	215	71	6	75	4	53	5	64	5	50	72	4	54	6	63	7	73	4						
UPPER-PENINSULAR DIVISION.†	4	—	—	75	4	100	3	100	5	—	100	3	—	—	—	—	—	—						
Marquette, H. S. Tugla..... ^a	4	0	0	25	13	0	0	0	0	0	0	0	0	0	0	0	0	0						
Stonerville, T. Heaton..... ^b	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
NORTH-WESTERN DIVISION.†	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Fyfe Lake, H. T. Culkins..... ^c	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
NORTH-EASTERN DIVISION.†	4	0	0	25	2	0	0	0	0	0	0	0	0	0	0	0	0	0						
Alpena, Wm. P. Menden..... ^d	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
WESTERN DIVISION.†	4	—	—	100	—	25	6	—	—	—	50	5	—	—	—	—	—	—						
Grand Haven, A. Vander Veem..... ^e	4	—	—	100	—	25	6	—	—	—	50	5	—	—	—	—	—	—						
Grand Rapids, A. Hazlewood..... ^f	4	—	—	25	3	—	—	50	3	—	—	—	25	—	—	—	—	—						
Holland, B. Ladebaer..... ^g	4	50	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—						
Lamont, J. C. McIlvain..... ^h	4	100	4	—	—	—	—	25	7	—	75	5	—	—	—	—	—	—						
Rockford, D. W. C. Burch..... ⁱ	4	—	—	100	6	0	0	75	9	0	100	7	25	11	0	0	0	0						
CENTRAL DIVISION.†	4	50	11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—						
Charlotte, G. B. Allen..... ^j	4	75	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
De Witt, G. W. Topping..... ^k	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Hastings, A. P. Drake..... ^l	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Howell, C. V. Beebe..... ^m	4	75	4	0	0	0	0	0	0	0	100	4	0	0	0	0	0	0						
Hubbardston, H. W. Browne..... ⁿ	4	100	6	—	—	—	—	50	7	—	50	6	—	—	—	—	—	—						
Ionia, W. B. Thomas..... ^o	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—						
Laings, J. B. Hull..... ^p	4	50	5	0	0	0	0	0	0	0	75	1	25	2	0	0	0	0						
Lyons, D. C. Spalding..... ^q	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
North Lansing, O. Marshall..... ^r	4	0	0	0	0	0	0	0	0	0	25	3	0	0	0	0	0	0						
Ortville, A. W. Nicholson..... ^s	4	0	0	0	0	0	0	0	0	0	50	3	0	0	0	0	0	0						
Ovid, O. B. Campbell..... ^t	4	0	0	25	2	0	0	0	0	0	50	3	0	0	0	0	25	3						
BAY AND EASTERN DIVISION.†	4	100	2	0	0	25	7	0	0	0	75	3	25	7	0	0	0	0						
Lapeer, A. Nish..... ^u	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Port Huron, H. R. Mills..... ^v	4	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0						
Port Huron, M. Northup..... ^w	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Saginaw City, N. D. Lee..... ^x	4	0	0	0	0	0	0	0	0	0	100	3	25	9	0	0	0	0						
Port Sinclair, J. M. Loop..... ^y	4	0	0	0	0	0	0	0	0	0	50	3	0	0	0	0	0	0						
Thornville, John S. Cankins..... ^z	4	75	7	100	4	0	0	0	0	0	50	6	0	0	0	0	100	1						
West Bay City, L. E. Randall..... ^{aa}	4	0	0	0	0	0	0	0	0	0	75	5	0	0	0	6	0	0						
SOUTH-WESTERN DIVISION.†	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Benton Harbor, John Bell..... ^{ab}	4	0	0	0	0	0	0	0	0	0	100	6	75	5	0	0	0	0						
Mattawan, Thos. H. Briggs..... ^{ac}	4	0	0	33	2	0	0	0	0	0	33	2	67	1	0	0	0	0						

(Health Officers in italics; those also
Correspondents marked with a *.)

[illegible]

* Health Officer and Correspondent.

+ For counties in each Division, see Exhibit 1, page 171.

[†], §, ||, For explanations of the methods of compiling this table, see foot-notes on page 297; for comments, see page 253.

* Weeks ending July 7 and 21, changeable. Weeks ending July 14 and 28, hot.

a, b, c, etc. These letters refer across the page, from the names of Observers to statements concerning the amount of sickness, and relative to diseases reported by them in addition to those printed on the postal blanks.

NOTE.—July 3, A. T. Scarlett, Health Officer of Alcona township, Alcona Co., reported 10 cases of Small-pox (with one death); and that the disease was believed to have been brought from Wisconsin.

July 13, an epidemic of Whooping-cough at Chester, Eaton Co., was reported by J. L. Johnston, M. D., Health Officer.

TABLE 3.—CONTINUED.—Diseases, by Localities in Michigan, Five Weeks ending September 1, 1877.

DIVISIONS AND LOCALITIES REPRESENTED, AND PHYSICIANS WHO REPORTED.	Bronchitis.		Cerebro-spinal Meningitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membranous.		Diphtheria.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric).	
	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when Prevalent.	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when Prevalent.	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when Prevalent.	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when Prevalent.	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when Prevalent.	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when Prevalent.	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when Prevalent.	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when Prevalent.	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when Prevalent.	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when Prevalent.	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when Prevalent.	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when Prevalent.
ALL LOCALITIES.	272	63	20	5	73	4	67	4	84	6	43	10	50	6	89	2	48	6	35	42	82	52	33	6
UPPER-PENINSULAR DIVISION. †																								
Marquette, H. S. Taft.	15	80				3	100	3	80	7					100	1			100	7	40	2		
Stonington, T. Heaton.	624	0	0	0	33	4	33	4	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
NORTH-WESTERN DIVISION. †																								
Fyfe Lake, H. T. Atkins.	5	0	0	0	0	0	0	0	0	0	0	0	0	0	80	1	0	0	40	12	0	0	0	0
NORTH-EASTERN DIVISION. †																								
Alpena, H. P. Menden.	5				100	1	100	3							100	2					60	5	40	6
WESTERN DIVISION. †																								
Grand Haven, A. Vander Veer.	12	20			100	4	80	5							100	3	40	8	100	4	60	3		
Grand Rapids, A. Hazlewood.	12				40	6	60	6	100	5					100	3			60	12	100	1		
Holland, B. Leidecker.	23														60	4			60	12	100	1	40	3
Lamont, J. C. McIlwain.	22				33	5	80	3							40	4	67	4	100	12	100	1		
Rockford, D. W. C. Burch.	22														67	4				12	100			
CENTRAL DIVISION. †																								
Charlotte, G. B. Allen.	5	100	6	6	100	9	100	6	100	13	0	0	0	0	100	1	0	0	100	12	100	5	20	15
DeWitt, G. W. Topping.	5	0	0	0	0	0	0	0	0	0	0	0	0	0	100	4	0	0	100	12	100	1	0	0
Hastings, A. P. Drake.	5	0	0	0	0	0	0	0	100	5	0	0	0	0	80	3	0	0	100	12	100	0	0	0
Howell, C. V. Beebe.	5	20	6	6	0	0	20	7	0	0	0	0	60	1	100	2	0	0	100	12	100	4	0	0
Inbarrison, H. W. Browne.	5														100	3			100	12	100	0	0	0
Ionia, Wm. B. Thomas.	5														80	4			100	12	100	3	20	6
Lansing, J. B. Hall.	5				80	2	60	3							20	4			100	12	100	3		
Lyons, D. C. Spalding.	5	0	0	0	60	5	0	0	0	0	0	0	0	0	40	5			100	12	100	1	0	0
North Lansing, O. Marshall.	5	0	0	0	20	4	100	2	0	0	0	0	0	0	80	4			100	12	100	1	80	5
Ovid, A. W. Nicholson.	5	40	3	0	0	0	4	0	0	0	0	0	0	0	100	0	0	0	100	12	100	0	0	0
Ovid, O. R. Campbell.	5	0	0	0	0	1	0	0	0	0	0	0	0	0	100	0	0	0	100	12	100	0	0	0
BAY AND EASTERN DIVISION. †																								
Lapeer, A. X. Rose.	5	0	0	0	100	7	100	6	0	0	0	0	0	0	100	4	0	0	100	12	100	0	0	0
Port Huron, R. T. Mills.	5	0	0	0	0	0	20	2	20	3	0	0	0	0	80	4			100	12	100	0	20	4
St Ignace, J. M. Lee.	5	100	7	0	100	4	100	5	100	8	0	0	0	0	100	3	20	11	100	12	100	20	20	10
St Ignace, J. M. Lee.	5				20	3									90	2			100	12	100	0	0	0
Thosville, John S. Watkins.	5	100	5	0	80	4	100	4	0	0	0	0	0	0	100	3	60	0	100	12	100	0	0	0
West Bay View, R. Randall.	5	40	3	0	80	4	100	4	100	4	0	0	20	4	100	4	60	4	100	12	100	1	0	0
SOUTH-WESTERN DIVISION. †																								
Renton Harbor, John Bell.	4	0	0	0	50	4	50	5	100	6	25	6	0	0	100	3	0	0	100	12	100	0	0	0
Mattawan, T. H. Briggs.	4	0	0	0	50	7	50	7	100	6	0	0	0	0	100	4	25	6	100	12	100	50	0	0
Niles, Simeon Belknap.	5	0	0	0	100	3	40	6	20	7	0	0	0	0	100	2			100	12	100	40	6	6

(Health Officers in italics; those also Correspondents marked with a *.)

Niles, Simon Belnap.....	5	40	7	0	0	0	0	0	20	5	80	7	0	0
Niles, James S. Reeves..... <i>c</i>	5		20	5					40	100	5			
Osgood, Milton Chase..... <i>f</i>	5				20	5			20	6	40	5		20
Paw Paw, J. Andrews..... <i>g</i>	5	0	0	20					40	5				60
St. Joseph, R. F. Stratton.....†	5													
SOUTHERN CENTRAL DIVISION.														
Albion, J. P. Stoddard.....‡	5	0	0	100	5	40	4	100	3	0	100	3	0	80
Ann Arbor, W. F. Breakey.....	5													
Brooklyn, E. N. Palmer.....	5	20	5	0	0	0	0	40	5	0	100	7	0	0
Caldwaller, Louis H. Hart®.....‡	5	20	7	0	0	0	0	0	0	0	100	6	0	0
Kalamazoo, W. B. Southard.....	5	0	0	0	20	5	0	0	0	0	100	0	0	0
Mendon, H. C. Clapp.....	5	0	0	0	0	0	0	0	0	0	0	0	0	0
Mendon, Edwin Stewart..... <i>j</i>	5	0	0	20	3	0	4	0	0	0	20	4	0	0
Sturgis, N. I. Packard.....	5	0	0	40	6	0	0	0	0	0	40	7	0	0
Tremsehl, C. M. Woodward.....	5	100	2	0	0	0	0	0	0	0	0	0	0	40
Three Rivers, L. S. Stevens..... <i>k</i>	5	0	0	20	3	0	0	0	0	0	0	0	0	60
York, F. M. Oakley.....	5	0	0	0	0	0	0	0	0	0	40	0	0	0
Ypsilanti, Edward Badwal®..... <i>l</i>	5	80	2											
SOUTH-EASTERN DIVISION.†														
Detroit, Leartus Connor.....	5	100	6	60	10	100	12	60	13	0	100	9	100	7
Detroit, W. H. Rouse..... <i>m</i>	5	100	13	100	7			100	11		100	13	100	16
Milford, Robert Johnston.....	5													
Monroe, Edward Dorsch..... <i>n</i>	5	100	5	60	6	0	0	20	6	0	100	5	0	100
Norville, J. M. Swift..... <i>o</i>	5													
Pontiac, John P. Wilson.....	5	0	0	0	0	0	0	0	0	0	0	0	0	0
Utica, Wm. Brownell..... <i>p</i>	5	60	9	0	0	0	0	0	0	0	20	7	0	0
Walled Lake, E. A. Chapman.....	5	20	3	0	0	0	0	0	0	0	0	0	0	0
Wayne, Ira W. Fletcher..... <i>q</i>	5	5	0	0	0	0	0	0	0	0	0	0	0	0
Wyandotte, E. P. Christian..... <i>r</i>	5													
Wyandotte, T. J. Langlois.....	5	0	0	0	0	0	0	0	0	0	20	7	0	0

* Health Officer and Correspondent.

division, see Exhibit 1, page 171.

[†], S, || For explanations of the methods of compiling this table, see foot-notes on page 297; for comments, see page 253.

Weather hot and dry, 2 weeks ending Aug. 11; changeable, Aug. 18 and Sept. 1.

a, b, c, etc. These letters refer across the page, from the names of Observers to statements concerning the amount of sickness, and relative to diseases reported by them in addition to those printed on the postal blanks.

TABLE 3.—CONTINUED.—Diseases in Michigan, Four Weeks ending September 29, 1877.

DIVISIONS AND LOCALITIES REPRESENTED, AND PHYSICIANS WHO REPORTED.	Number of Reports received.	Bronchitis.		Cerebro-Spinal Meningitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membranous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric).	
		Per Cent of Weeks	Av. Order of Prevalence	Per Cent of Weeks	Av. Order of Prevalence	Per Cent of Weeks	Av. Order of Prevalence	Per Cent of Weeks	Av. Order of Prevalence	Per Cent of Weeks	Av. Order of Prevalence	Per Cent of Weeks	Av. Order of Prevalence	Per Cent of Weeks	Av. Order of Prevalence	Per Cent of Weeks	Av. Order of Prevalence	Per Cent of Weeks	Av. Order of Prevalence	Per Cent of Weeks	Av. Order of Prevalence	Per Cent of Weeks	Av. Order of Prevalence	Per Cent of Weeks	Av. Order of Prevalence	Per Cent of Weeks	Av. Order of Prevalence
ALL LOCALITIES—	232	77	5	31	7	70	5	59	5	80	6	33	7	54	6	84	3	75	4	55	8	95	15	91	35	67	5
UPPER-PENINSULAR DIVISION. †																											
Marquette, H. S. Taft.....	4	100	10	—	—	—	4	100	4	100	8	—	—	—	—	100	1	100	10	—	—	100	4	50	6	—	—
Stonington, T. Heaton.....	3	0	0	0	0	33	3	33	3	0	0	0	0	0	0	33	3	33	3	0	0	0	0	33	1	0	0
NORTH-WESTERN DIVISION. †																											
Eyota Lake, H. T. Calkins.....	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	1	25	1	0	0	50	1	25	1	0	0
NORTH-EASTERN DIVISION. †																											
Alpena, Wm. P. Maiden.....	4	100	2	0	0	100	4	100	3	0	0	0	0	0	0	100	2	100	5	0	0	0	0	0	0	100	6
WESTERN DIVISION. †																											
Grand Haven, A. Vander Veer.....	4	—	—	—	—	100	4	25	7	—	—	—	—	—	—	75	4	100	10	25	5	75	3	100	1	50	7
Grand Rapids, Arthur Hazlewood.....	4	—	—	—	—	—	—	25	3	100	5	—	—	100	5	100	2	100	3	—	—	100	3	100	1	75	3
Holland, B. Ledebor.....	4	25	3	—	—	—	3	25	3	—	—	25	3	—	—	100	2	75	3	—	—	50	3	100	1	75	3
Lamont, J. C. McQuinn.....	4	0	0	0	0	0	0	25	5	0	0	0	0	0	0	75	4	75	3	50	6	100	1	100	0	75	5
Rockford, D. W. C. Burch.....	4	0	0	0	0	0	0	—	—	0	0	0	0	0	0	—	—	—	—	—	—	0	0	0	0	—	—
CENTRAL DIVISION. †																											
Charlotte, G. B. Allen.....	4	100	7	50	13	100	5	100	9	100	13	0	0	0	0	100	1	100	10	0	0	100	3	100	5	100	11
DeWitt, G. W. Topping.....	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	3	100	3	0	0	100	1	100	0	0	0
Hastings, A. P. Drake.....	4	0	0	0	0	0	0	0	0	100	5	0	0	75	6	100	3	100	3	0	0	100	0	100	0	0	0
Howell, C. V. Beebe.....	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	3	75	3	25	5	100	2	100	3	0	0
Hubbardston, H. W. Browne.....	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ionia, Wm. B. Thomas.....	4	0	0	0	0	25	5	100	4	0	0	0	0	0	0	100	2	50	5	—	—	100	2	100	3	100	0
Laings, J. W. Hagadorn.....	3	33	5	—	—	—	—	—	—	—	—	—	—	—	—	33	6	33	2	—	—	100	2	100	1	—	—
Laings, J. B. Hull.....	4	0	0	0	0	50	3	—	—	—	—	—	—	—	—	25	3	—	—	—	—	25	50	2	—	—	
Lyons, D. C. Spalding.....	4	0	0	0	0	100	6	50	6	0	0	0	0	0	0	100	3	100	6	0	0	100	3	100	4	100	0
North Laings, O. Marshall.....	4	50	5	0	0	50	6	0	0	100	2	0	0	0	0	100	5	75	4	0	0	100	1	100	4	100	3
Otisville, A. W. Nicholson.....	4	25	5	0	0	0	0	25	4	0	0	0	0	0	0	75	2	50	2	0	0	100	1	100	2	100	3
Ovid, O. B. Campbell.....	4	0	0	0	0	0	0	0	0	0	0	25	2	0	0	100	3	50	2	0	0	100	1	100	2	100	0
BAY AND EASTERN DIVISION. †																											
East Saginaw, Nelson H. Cladin.....	2	100	6	0	0	0	0	0	0	100	9	50	8	0	0	100	6	50	6	50	8	100	1	100	7	50	3
East Saginaw, Samuel Kitchen.....	2	100	4	0	0	50	5	100	5	0	0	0	0	0	0	100	3	100	4	0	0	100	1	100	3	100	4
Lapeer, A. Nash.....	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	5	0	0	0	0	100	2	100	0	0	0
Port Huron, H. R. Mills.....	4	0	0	0	0	25	4	25	3	75	8	0	0	50	5	25	9	0	0	0	0	100	1	100	0	50	4
Port Huron, A. A. Whitney.....	4	100	2	0	0	0	0	0	0	0	0	0	0	0	0	100	3	100	3	75	12	100	2	100	9	100	10
Saginaw City, N. D. Lee.....	4	100	7	0	0	100	6	100	6	100	9	0	0	0	0	100	3	100	3	0	0	100	1	100	9	100	0
Port Sanilac, J. M. Loop.....	4	—	—	—	—	—	—	25	4	—	—	—	—	—	—	100	2	100	3	—	—	75	2	100	1	100	0
Thornville, John S. Caulkins.....	4	75	4	0	0	100	4	100	3	0	0	0	0	0	0	100	3	100	3	6	6	100	1	100	0	100	0

(Health Officers in italics; those also Correspondents marked with a *.)

West Bay City, I. E. Randall	4	100	4	0	0	0	100	4	100	5	0	25	4	100	1	100	21	25	4
SOUTH-WESTERN DIVISION.†																			
Rangor, J. E. Ferguson	2	0	0	0	0	50	9	0	100	0	50	100	8	100	1	100	21	25	4
Renton Harbor, John Bell	4	0	0	25	8	0	25	3	100	5	0	0	0	100	1	100	21	25	4
Matawan, Thos. H. Briggs	4	50	7	0	0	50	3	25	7	100	4	0	0	100	2	100	21	25	4
Otsego, Milton Chase	4	25	3	25	1	0	0	0	25	5	0	0	0	100	2	100	21	25	4
Paw Paw, J. Andrews	4	25	3	25	1	0	0	0	0	0	0	0	0	100	1	100	21	25	4
St. Joseph, R. F. Stratton	4	25	3	25	1	0	0	0	0	0	0	0	0	100	1	100	21	25	4
SOUTHERN-CENTRAL DIVISION.†																			
Albion, J. P. Sholdard	4	100	3	0	0	75	3	100	3	100	2	0	0	100	1	100	21	25	4
Blissfield, Hal C. Wyman	4	0	0	0	0	50	0	0	0	0	0	0	0	100	1	100	21	25	4
Brooklyn, E. N. Palmer	4	0	0	0	0	0	0	0	0	0	0	0	0	100	1	100	21	25	4
Coldwater, L. H. Wartz	4	50	2	0	100	7	25	5	0	0	0	0	0	100	2	100	21	25	4
Jackson (State Prison), E. L. Kimball	4	100	2	0	0	0	25	7	100	5	0	0	0	100	2	100	21	25	4
Kalamazoo, W. B. Southard	4	0	0	0	0	75	3	50	6	0	0	0	0	100	2	100	21	25	4
Mendon, H. C. Clapp	4	100	5	0	0	0	0	0	0	0	0	0	0	100	2	100	21	25	4
Mendon, Edwin Stewart	4	75	3	25	5	0	0	0	100	5	0	0	0	100	1	100	21	25	4
Sturgis, N. I. Packard	4	0	0	0	0	25	7	0	100	5	0	0	0	100	1	100	21	25	4
Tecumseh, C. M. Woodward	4	75	3	0	0	50	3	50	3	0	0	0	0	100	1	100	21	25	4
Three Rivers, C. W. Backus	4	100	9	0	0	50	7	100	4	0	0	0	0	100	1	100	21	25	4
York, E. M. Oakley	4	50	4	0	0	0	0	0	0	0	0	0	0	100	1	100	21	25	4
Ypsilanti, Edward Batwell*	4	0	0	0	0	0	0	0	0	0	0	0	0	100	1	100	21	25	4
SOUTH-EASTERN DIVISION.†																			
Detroit, Leartus Connor	4	100	3	0	0	25	16	25	8	100	5	0	0	100	1	100	21	25	4
Detroit, W. H. Rouse	4	100	9	0	0	100	7	100	6	100	8	50	18	100	2	100	21	25	4
Milford, Robert Johnston	4	100	4	0	0	100	5	100	5	100	5	25	6	100	1	100	21	25	4
Monroe, Edward Dorseth	4	75	6	0	0	100	3	100	5	75	3	25	6	100	1	100	21	25	4
Northville, J. M. Swift	4	0	0	0	0	0	0	0	0	0	0	0	0	100	1	100	21	25	4
Pontiac, John P. Wilson	4	0	0	0	0	0	0	0	0	0	0	0	0	100	1	100	21	25	4
Utica, Wm. Brownell	4	0	0	0	0	100	8	100	5	100	10	0	0	100	2	100	21	25	4
Walled Lake, E. A. Chapman	4	0	0	0	0	0	0	50	4	0	0	0	0	100	1	100	21	25	4
Wayne, Ira W. Fletcher	4	75	4	0	0	0	0	25	3	100	3	0	0	100	1	100	21	25	4
Wyandotte, E. P. Christian	4	50	4	0	0	50	3	25	4	25	3	25	3	100	1	100	21	25	4
Wyandotte, F. J. Langlois	4	0	0	0	0	75	4	0	100	6	0	0	0	100	1	100	21	25	4

* Health Officer and Correspondent.

† For counties in each Division, see Exhibit 1, page 171.

‡, §, || For explanations of the methods of compiling this table, see foot notes on page 297; for comments, see page 253.

TABLE 3.—Diseases, by Localities in Michigan, Four Weeks ending September 29, 1877—CONTINUED.

DIVISIONS AND LOCALITIES REPRESENTED, AND PHYSICIANS WHO REPORTED.	Fever, Typho-malarial.		Influenza.		Measles.		Pneumonia.		Puerperal Fever.		Rheumatism.		Scarlatina.		Small-pox.		Whooping-cough.		DISEASES REPORTED, WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC.	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when Reported.
	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when Reported.	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when Reported.	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when Reported.	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when Reported.	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when Reported.	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when Reported.	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when Reported.	Per Cent of Weeks Prevalent.	Av. Order of Prevalence when Reported.					
ALL LOCALITIES||	232	79	4	71	5	50	6	61	7	35	6	72	5	72	5	78	6				
UPPER-PENINSULAR DIVISION.†																					
Marquette, H. S. Tuft.	4	100	6	75	6			50	8			100	1						Neuralgia.	50	
Stonewille, T. Heaton.	3	0	0	0	0	0	0	0	0	0	0	33	1						(Diabetes Dropsy Asthma Chloroform Alopecia Scrofula Colic	100	
NORTH-WESTERN DIVISION.†																					
Frye Lake, H. T. Calkins.	4	0	0	0	0	0	0	0	0	0	0	0	0							75	
NORTH-EASTERN DIVISION.†																					
Alpena, Wm. P. Menden.	4	0	0	0	0	0	0	0	0	0	0	100	7							25	
WESTERN DIVISION.†																					
Grand Haven, A. Vander Teem.	4											25	8							50	
Gr. Rapids, Arthur Hazlewood.	4											25								25	
Holland, B. Leckboer.	4	25	3				100	2				35								50	
Lamont, J. C. McIlvain.	4											50	3							25	
RECKFORD, D. W. C. Burch.	4	100	2	0	0	0	0	0	0	0	0	50	3							25	
CENTRAL DIVISION.†																					
Charlotte, G. B. Allen.	4	100	8	100	4	0	100	11	0	0	0	100	0	0	0	0	0	0		50	
De Witt, G. W. Topping.	4	25	5	0	0	0	0	0	0	0	0	75	0	0	0	0	0	0		50	
Hastings, A. P. Drake.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		50	
Howell, C. V. Beebe.	4	100	5	75	6	0	0	0	0	0	0	100	7	0	0	0	0	0		50	
Hubbardsston, H. W. Browne.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		50	
Ionia, Wm. B. Thomas.	4	100	5	0	0	0	0	0	0	0	0	50	7	4	0	0	0	0		50	
Lansing, J. W. Hagadorn.	3	67	3	67	5	25	5	50	7	33	35	35	3	75	2					25	
Lansing, J. B. Hull.	4	100	1	0	0	0	0	0	0	25	4	25	4							50	
Lyons, D. C. Spalding.	4	100	4	50	7	0	0	0	0	0	0	0	0	0	0	0	0	0		50	
North Lansing, O. Marshall.	4	0	0	0	0	0	0	25	6	0	0	25	4	0	0	0	0	0		50	
Ottisville, A. W. Nicholson.	4	25	0	0	0	0	0	0	0	0	0	25	4	0	0	0	0	0		50	
Ovid, O. B. Campbell.	4	0	0	0	0	0	0	0	0	0	0	75	4	25	1	0	0	0		50	
BAY AND EASTERN DIVISION.†																					
East Saginaw, Nelson H. Cladin.	2	100	12	0	0	0	50	12	0	0	0	100	5	50	5	0	0	0		25	
East Saginaw, Samuel Kitchend.	2	100	3	50	4	0	0	0	0	50	4	100	7	50	5	0	0	0		25	
Lapeer, A. Nash.	4	100	3	0	0	0	0	0	0	0	0	100	2	0	0	0	0	0		25	
Port Huron, H. R. Mills.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		25	
Port Huron, A. A. Whitney.	4	100	5	75	4	0	0	25	6	0	0	75	6	0	0	0	0	0		25	
Saginaw City, N. D. Lee.	4	50	11	0	0	0	0	0	0	25	12	100	4	25	9	0	0	0		25	
Port Sanilac, J. M. Loop.	4	100	6	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0		25	
Thornville, J. S. Calkins.	4	100	6	100	5	0	0	0	0	0	0	100	7	0	0	0	0	0		25	
West Bay City, I. E. Randall.	4	25	4	75	0	0	0	0	0	0	0	75	4	0	0	0	0	0		25	

DISEASES REPORTED, WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESSES, ETC.

a Neuralgia. 50

b { Diabetes. 100
Dropsy. 75
Asthma. 50
Chorea. 75
Atrophy. 25
Scrofula. 11
Colic. 7

c Puerperal peritonitis, one case. 25

d { Tonsillitis. 50
Gastric fever. 4
Enteritis. 4
Catarrh. 3

e { Rheumatism in my reports includes neuralgia, etc., Sept. 15. No frost here yet, Sept. 29. 25

f { Inflammation of the tongue. 25
Bilious colic. 25
Herpes zoster. 25
Tonsillitis. 25
Neuralgia. 25
Myelitis. 25
Catarrh. 25

g { Very little sickness, weeks ending Sept. 8 and 22. 75

h Acute Catarrh. 4

(Health Officers in italics; those also Correspondents marked with a *.)

SOUTHWESTERN DIVISION. †																					
2	100	3	50	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	i	25
3	100	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		25
4	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		25
4	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		25
4	50	35	2	0	0	0	25	2	0	0	0	0	0	0	0	0	0	0	0	j	25
4	50	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		25
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		25
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		25
4	100	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	k	25
4	50	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		25
4	100	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		25
4	100	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		25
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	l	25
4	50	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		25
4	100	2	50	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		25
4	75	3	100	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		25
4	50	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	m	100
4	100	6	50	3	100	10	50	13	0	0	0	0	0	0	0	0	0	0	0		50
4	100	13	100	6	0	0	0	100	12	0	0	0	0	0	0	0	0	0	0		50
4	100	4	100	6	0	0	0	25	6	0	0	0	0	0	0	0	0	0	0		50
4	75	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	n	100
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		50
4	50	10	50	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		100
4	75	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		50
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	o	100
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		50
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		100
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		50

* Health Officer and Correspondent. † For counties in each Division, see Exhibit 1, page 171.

‡, §, || For explanations of the methods of compiling this table, see foot-notes on page 297; for comments, see page 253.

¶ Weather very dry, dusty, and warm, Sept. 29.

a, b, c, etc. These letters refer across the page, from the names of Observers to statements concerning the amount of sickness, and relative to diseases reported by them in addition to those printed on the postal blanks.

NOTE.—September 19, Thos. Carney, Sr., Health Officer of Bay City, reported nine cases of Varioloid, and 32 cases of Small-pox (including 12 deaths from Small-pox) as having occurred in Bay City from March 29 to July 19, 1877.

RELATIVE TO

ERYSIPELAS AND PUERPERAL FEVER:

BEING REPLIES, BY NINE OBSERVERS OF DISEASES, TO A LETTER OF INQUIRY
CONCERNING ANY RELATION BETWEEN THE TWO DISEASES.

Prepared for publication in the office of the Secretary of the State Board of Health.

REPLIES TO A LETTER OF INQUIRY CONCERNING THE RELATION OF ERYSIPELAS AND PUERPERAL FEVER.

The weekly reports of diseases sometimes showed the existence of erysipelas and puerperal fever at the same place and time. This was considered a favorable opportunity to inquire into the possible relation between these two diseases. Accordingly a letter was sent to those Observers who simultaneously reported the two diseases. The letter was slightly varied in different cases, but the following is a fair representative of all:

In your report of diseases for the week ending Saturday, ———, you mention both Erysipelas and Puerperal Fever. So much has been written concerning the relation of these two diseases that we desire to obtain and place on record facts bearing on the subject, whenever an opportunity occurs. Will you have the kindness to write me concerning these cases? After you have investigated the subject, I should be glad to have a report of the facts tending to prove or disprove *any* connection or relation between the two diseases.

Up to the present time nine replies to this letter have been received, and although not numerous enough to bear with much force upon the opinion of relation that prevails, something may be learned from them which may be useful in estimating the factors in the causation of puerperal fever. One Observer gives good evidence of a relation existing between the two diseases. One Observer reports a case of puerperal septicæmia a few days after confinement, the woman having been attended by a physician who had on the same day attended a case of facial erysipelas; but in this case the septicæmia may have been due to the absorption from decomposing blood clots. Two Observers give cases in which women were suffering from erysipelas at the time of confinement, yet there was no indication of puerperal fever. Two give cases where puerperal fever seemed to be due to neglect and unskillful treatment on the part of nurses and parties in charge. Whatever may be the relation between erysipelas and puerperal fever, it seems evident that these two cases of puerperal fever might have been prevented by proper means. The history of these cases suggests that the intelligent physician can do much toward preventing, if he cannot entirely prevent, such disease, if the care of such physician is secured; but it also suggests that quite a large proportion of the people have not sufficient knowledge to enable them to appreciate the need of the expert aid of an intelligent physician under such or similar circumstances.

The replies are as follows:

REPLIES BY WM. DOWLMAN, M. D., OF GREENVILLE, MICH.

Secretary State Board of Health:

DEAR SIR:—I received your communication of Feb. 12, and now reply to it.

There seems to be no traceable connection of the cases of erysipelas with those of puerperal fever. The fever occurring in lying-in-women has been slight, while the cases of erysipelas have been quite severe. A slight injury has seemed to produce erysipelas; one woman (case proving fatal), pricked herself with a pin while washing, —and in other cases a simple hurt has produced inflammation of this character. We do not consider that there is any epidemic here, but certainly there is a disposition to erysipelatous inflammation on slight provocation.

Yours respectfully,

Greenville, Montcalm Co., Mich., Feb. 17, 1877.

W. DOWLMAN.

REPLIES BY A. I. SAWYER, M. D., OF MONROE, MICH.

DEAR DOCTOR:—In reply to your inquiries of the 19th, permit me to say that I cannot trace any connection with or relation to each other. The erysipelas preceded both the septicemia and puerperal fever, and septicemia the last, but they were at least three miles apart. One followed exsection of the elbow; one, craniotomy after all sorts of efforts, by different parties, at delivery; and the other followed or attended retained placenta for two or three months.

Yours sincerely,

Monroe, Monroe Co., Mich., Feb. 23, 1877.

A. I. SAWYER.

REPLIES BY GEO. J. NORTHROP, M. D., OF MARQUETTE, MICH.

Secretary State Board of Health:

DEAR SIR:—In reply to your letter of the 13th inst., regarding erysipelas and puerperal fever reported by me on the 3d inst., I have to state that, on the morning of Feb. 25th, I found a little patient who had suppurative inflammation of the ear with facial erysipelas, commencing with the diseased ear, which was limited to the affected side of the face, and the child recovered in about a week.

We have had erysipelas this winter, although I had not met it before since in December, as reported, and I would therefore ask to have my report of February 17th corrected; for although there was a severe case here during that and the succeeding week, I did not see it at any time, neither did the physician in charge see my puerperal patient, nor was there any intercourse between the two families, who live in opposite sides of the town.

[Dr. Northrop then describes at some length a case of pregnancy which he attended, the last months of which were accompanied with poor health, suppression of urine, evidence of uremic poisoning, with disturbance of vision, fainting, increased anæmia, hydremia, and general anasarca. The labor began February 21, and was long-continued, but could not be called severe. At 3 P. M., February 25, the membranes ruptured; at 9 P. M., severe expulsive pains began, and at 10:30 P. M., the woman was delivered of a fine healthy boy. The mother was greatly prostrated, but rallied fairly by the next day. The functions of the kidneys were restored, and although anxious about her recovery, he felt greatly encouraged during the three succeeding days that he saw her. Then he was discharged and the patient placed in the hands of a nurse, as the nurse assured them she would have the patient about in ten days if she could only be allowed to have her own way. Cleanliness, ventilation, and other hygienic measures were neglected, the decomposing discharges were absorbed and the patient's blood poisoned thereby. The patient had chills followed by high temperature, increased pulse and respiration. Inadequate nourishment had been used, and there was vomiting of everything taken, with intense headache.

At a time of more than usual peril, this case was withdrawn from the care of an intelligent physician and placed under the care of a woman who probably was not, to say the least, familiar with what has somewhat recently been learned by the medical profession. The patient died. It would seem that this is a coincidence of a kind that is altogether more common than it ought to be.

Dr. Northrop's interesting communication suggests, as has many times been suggested, 1. The immediate production of septic material as one source of puerperal disease. 2. That the intelligent physician can do much toward preventing, if he cannot entirely prevent, the presence or the serious effects of such decomposing material, *if the care of such a physician is secured.* 3. That quite a large proportion of the people have not sufficient knowledge to enable them to appreciate the need of the expert aid of an intelligent physician under such or similar circumstances.

[Five days after the nurse took charge of the patient, Dr. Northrop was recalled. His conclusions were as follows:]

"My diagnosis was puerperal septicæmia, or puerperal septic fever. * * * *"
 "The patient continued to sink daily, and died on the evening of March 8th, eleven days after her confinement, and eight days after the first change was noticed.

"I can see no connection between the two cases in support of the infectious or contagious theory, which I accept in full; and I always feel anxious, when I have to care for erysipelas with obstetric cases, as I have had to do heretofore, and always without any trouble.

"I have given you an extended history of the cases, that you might judge for yourself how far they were dependent upon each other."

Respectfully yours,

Marquette, Mich., March 23, 1877.

GEORGE J. NORTHROP.

REPLIES BY H. S. TAFT, M. D., OF MARQUETTE, MICH.

Secretary State Board of Health:

DEAR SIR:—If I reported puerperal fever as prevalent here in April, it was a mistake. There was one fatal case in the fore part of March, not in my practice, and I know nothing about it that can be relied upon; but I had a case, some years since, that in my mind was quite conclusive that there is no connection or relation between erysipelas and puerperal fever.

Jan. 23, 1873, I was called to see Mrs. Chas. Lonstron, and found her suffering with erysipelas of the face, the swelling completely closing both eyes. During the existence of the erysipelas she was confined, and had no symptoms of puerperal fever whatever, and made a good recovery.

Respectfully,

Marquette, Marquette Co., Mich., May 1, 1877.

H. S. TAFT, M. D.

REPLIES BY EDWARD DORSCH, M. D., OF MONROE, MICH.

Secretary State Board of Health:

I could not find any connection between two cases of erysipelas and puerperal fever. Those cases which I saw were in far distant localities; erysipelas towards north, puerperal fever south and south-west of Monroe. But the disposition which causes erysipelas may cause puerperal fever too; as I saw thirty years ago in Germany. Both happen at the same time.

Very respectfully yours,

Monroe, Monroe Co., Mich., July 1, 1877.

ED. DORSCH, M. D.

REPLIES BY L. CONNOR, M. D., OF DETROIT, MICH.

Secretary State Board of Health:

DEAR DOCTOR:—Your favor of May 7 was duly received and contents noted, and so far as possible, the cases re-examined. So far as these are concerned, there was nothing to indicate any connection between the "erysipelas" and "puerperal fever," as they were widely separated and in different walks of life, and some of different race and language. Such being the case, a full report would be of no use, and I let the matter drop until a more favorable class of cases occur.

Your friend,

Detroit, Wayne Co., July 23, 1877.

L. CONNOR.

REPLIES BY N. D. LEE, M. D., OF SAGINAW CITY, MICH.

Secretary of State Board of Health, Lansing, Mich.:

DEAR DOCTOR:—In reply to yours of the 11th inst., I would say that the cases of puerperal fever and erysipelas reported by me were not my cases, with the exception of one case of erysipelas, in which I was called in consultation. The cases of puerperal fever were confined, as near as I can find out, to one, possibly, two physicians. I can find out by the doctors but little on the subject, as they do not want to say much about it, or at least, act so. One of the cases the doctor in attendance consulted me about, for I have been their family physician for 26 years. The mother and all the children are of a very marked strumous habit of body, or condition. In October, 1873, I attended one of the daughters in the birth of a child, in a house separate from her mother's; the mother and three of the children had erysipelas; the children quite severely; the mother so that she could go to the daughter's house to see the new babe. In her confinement she got along nicely. I called next day; everything appeared to be doing well. Some days afterwards I was called, and found what I

at once pronounced, in all probability, a fatal case of acute peritonitis. The inflammation seemed to start in the left iliac region. She died. I believed then, and do now, that it was erysipelas. I cannot as yet, trace any connection between the erysipelas and puerperal cases reported by me a few days since, but I believe there is a connection. I have not seen a case of puerperal fever in fifteen years but what I laid it to erysipelas poison. I had a very marked case of it a few years since. I attended a half French and Indian midwife through a very severe attack of erysipelas. When she got able to be out, she attended five cases of child-birth, all of which died of puerperal fever. I was called in the last case and stopped her from attending any more confinements, and no more persons had puerperal fever. I will render you all the assistance I can, if I have another opportunity, for I am very much interested in the matter.

Very respectfully,

N. D. LEE, M. D.,
City Physician.

Saginaw City, Saginaw Co., Mich., Sept. 19, 1877.

REPLIES BY W. H. ROUSE, M. D., OF DETROIT, MICH.

DEAR DOCTOR:—Your favor of the 10th is at hand and its contents noted. The question is important, but the facts at hand are few.

1. In a rather large obstetric practice, I have never had a case of puerperal fever. All I have seen were in my preceptor's practice, while with him, or in the practice of my fellow practitioners.

2. I have seen quite a number of cases of erysipelas, and have attended puerperal women while attending these cases, without obvious injury.

3. The following case is a little remarkable: A lady in advanced stage of gestation had erysipelas of so severe a type that her recovery for some time was doubtful. As she was recovering, but not nearly well, labor at full time came on, and grave fears were entertained of results, but no symptom of puerperal fever was observed, though carefully watched by the two physicians who had attended her for erysipelas. Had there been so intimate connection as some state, this woman should have had puerperal fever; for she was exposed to contamination from attendants, from her rooms and bed, and from the germs (?) in her system.

4. I simply give this case, and ask further time to collect and arrange facts. I have devoted some attention to the subject, but have not all the facts necessary to make a proper report. When ready I will write you again.

Yours truly,

Detroit, Wayne Co., Mich., Oct. 12, 1877.

W. H. ROUSE, M. D.

REPLIES BY N. H. CLAFLIN, M. D., OF EAST SAGINAW, MICH.

Secretary State Board of Health:

DEAR SIR:—Your letter of the 10th inst. referring to my last weekly report, requesting information relative to cases of erysipelas and puerperal fever, is received. Those cases were in no way connected with each other. The first were simple, mild cases of facial erysipelas,—idiopathic. The patients were men who had been subject to occasional attacks for some years. I know of no cases of traumatic erysipelas at present.

In my reports, the term puerperal fever is used in a general sense, including pelvic cellulitis, metritis, metro-peritonitis, peritonitis, septicaemia, etc., where fever, pain, and tenderness were closely connected with the puerperal condition. One case reported was properly pulvic cellulitis and metritis following craniotomy; another, acute metritis with slight peritonitis, patient delivered by a midwife and, immediately after delivery, moved from a cot to a bed, the clothes changed, and the patient unnecessarily exposed to cold, resulting as above, with high fever for several days. I will try and take notes of any cases that come to my knowledge, which seem to prove a relation of the two diseases, or the contrary, and write you.

I have always been careful in handling erysipelas, even in idiopathic forms and mild cases; also, in keeping my hands from contact with the subject of a postmortem examination, in order to avoid all danger of communicating to my patients any poison that might cause puerperal fever, and have had but very little trouble in my own cases of confinement.

Very respectfully,

East Saginaw, Saginaw Co., Mich., Oct. 17, 1877. NELSON H. CLAFLIN, M. D.

CONTRIBUTIONS TO THE STUDY OF THE SPREAD

—OF—

DIPHTHERIA,

WITH A VIEW TO ITS

RESTRICTION AND PREVENTION:

BEING A REPORT OF A SPECIAL INVESTIGATION OF AN OUTBREAK OF DIPHTHERIA AT UNION CITY, REPLIES OF CORRESPONDENTS OF THIS BOARD, AND OTHERS TO A LETTER OF INQUIRY ON THE SUBJECT OF DIPHTHERIA, AND A REPORT OF A SPECIAL INVESTIGATION OF AN OUTBREAK OF DIPHTHERIA AT ROCHESTER, MICHIGAN.

! Arranged for publication in the office of the Secretary of the State Board of Health.

DIPHTHERIA.

The outbreaks of diphtheria at Union City and at Rochester were investigated at the request of this Board. The letters on diphtheria were received principally in reply to a letter of inquiry, sent to correspondents and others, where diphtheria was reported as prevailing or as having prevailed. The knowledge of the fact that diphtheria prevailed in any locality was usually derived from the weekly reports of diseases, a compilation of which is in a previous part of this volume. The letter of inquiry to each one was similar to that sent to the others. Considerable thought and care was devoted to the first letter, and those following were copies or modifications of it. In order that the questions might be modified to suit each particular case when necessary, and that additions and corrections might be made, as the need of them became apparent from the replies to letters already sent, no circular was printed, but a letter was written in each case, which letter was substantially as follows:

In your weekly report of diseases, diphtheria is reported. If convenient, will you have the kindness to reply to the following questions? Do you decide any case to be diphtheria except you find the diphtheritic membrane? Can you trace the *first* case that appeared in your vicinity to any source of contagion or origin? In any case, have you evidence that the disease was aggravated by unsanitary conditions? If so, what were those conditions? If there has been a severe case in which there was any probability of its relation to water used, what was the distance of the privy from the well from which the water-supply was derived? What was the nature of the soil?

Was the cellar damp or wet? In case there was no cellar, was the floor or under-floor space damp or mouldy? Did the patient or patients live on first or second floor? What number on first floor? What number slept on first floor? Were the personal habits cleanly? One of our correspondents has suggested that possibly the low condition of the water in the wells of his locality may have some relation to the throat trouble, especially as the quality of the water is thus badly affected. A microscopical examination of the water in one of these wells revealed the presence of great numbers of infusoria. Not that there is any necessary connection between the larger infusoria and diphtheria, but this was an indication that the water was not pure. Heisch's test for sewage contamination would be worth trying with suspected water (see page 119 of our last Report). If you have any facts bearing upon the relation of water-supply to diphtheria, please inform me. Any fact you may be able to communicate concerning the rise, spread, or control of diphtheria will be thankfully received.

Each of the 48 communications on this subject contains information of real value, while many of them are of great importance on account of the light they throw on points in this disease not fully understood by many outside the medical profession.

Evidence on the communicability of diphtheria by personal contact or association may be found in the reports by J. H. Beech, M. D., of Coldwater and J. S. Caulkins, M. D., of Thornville, and in the replies by H. C. Clapp, M. D. of Mendon, H. W. Young, M. D. of Nashville, C. Russell, M. D. of Hastings, J. M. Swift, M. D. of Northville, E. N. Palmer, M. D. of Brooklyn, J. P. Stoddard, M. D. of Albion, I. E. Randall, M. D. of West Bay City, O. Marshall, M. D. of North Lansing, W. F. Fisher, M. D. of Manistee.

For evidence of the aggravation of diphtheria, and its probable causation by bad water, and unsanitary surroundings, see the reports by J. H. Beech, M. D., of Coldwater, and J. S. Caulkins, M. D., of Thornville, and the replies by N. D. Lee, M. D. of Saginaw City, H. W. Young, M. D. of Nashville, C. Russell, M. D. of Hastings, G. W. Topping, M. D. of DeWitt, R. F. Stratton, M. D. of St. Joseph, John P. Wilson, M. D. of Pontiac, John S. Caulkins, M. D. of Thornville, W. H. Burr, M. D. of Bay City.

Evidence of the communicability of diphtheria by such refuse as is collected by market gardeners may be found in the reply by Samuel Kitchen, M. D. of East Saginaw.

Evidence of restriction of diphtheria by isolation of cases, and good sanitary conditions may be found in replies by N. I. Packard, M. D. of Sturgis, and H. C. Clapp, M. D. of Mendon.

Evidence that diphtheria may in some way be dependent on, or connected with, scarlet fever may be found in the reply by R. F. Stratton, M. D. of St. Joseph.

Evidence that diphtheria is aggravated by crowding in close rooms is found in the reply by H. W. Young, M. D. of Nashville.

Evidence that diphtheria is communicated by infected clothing may be found in the replies by J. M. Swift, M. D. of Northville, H. C. Clapp, M. D. of Mendon, H. W. Young, M. D. of Nashville.

The difficulty of tracing the spread of diphtheria in a large city is brought out in the reply of Dr. Connor of Detroit.

As to what has been considered diphtheria, two opinions seem to have obtained: one that the false membrane must be present in every case; and the other that following a well-marked case there may be others, in the same household, which might with propriety be called diphtheria, having all the characteristics of the first case, except the membranous exudation. Some physicians seem to call such cases, not thus related, influenza.

The above examples from these replies, are mentioned to show some of the points on which information may be derived. They are adduced rather as a beginning than as a completion of study of the subject.

The following are the reports and the replies:

REPORT OF A SPECIAL INVESTIGATION OF AN OUTBREAK OF DIPHTHERIA AT UNION CITY, MICHIGAN, INVESTIGATED AT THE REQUEST OF THE STATE BOARD OF HEALTH BY J. H. BEECH, M. D., OF COLDWATER, MICH.

To the Honorable, the Board of Health of the State of Michigan:

GENTLEMEN:—In accordance with your request I visited the village of Union City—situated near the northern limits of Branch county—at the confluence of the Coldwater and Little Saint Joseph rivers, on the 31st day of October, 1876, and made such inquiries and investigations as limited time and opportunities would permit, in regard to the epidemic diphtheric disease which had prevailed there and in that vicinity during the previous eight months. I am greatly indebted to H. F. Ewers, M. D., of Union City, for his personal aid in the matter.

The constitutional atmospheric tendency to catarrhal and bronchial affections, with tenacious exudates had been observed by several physicians early in the spring, but to no alarming degree.

The first fatal case was that of a lad under Dr. Ewers' care, and presented clearly defined features of membranous croup. The sickness was of only two or three days' duration. Dr. E. had not discovered any miasmatic or enthetic causes of the attack in the case.

The second case of death occurred in a family consisting of a healthy father, a mother in the last stages of consumption, and five ordinarily healthy children, some of whom attended school. From external appearance of the house, I judged that the sleeping rooms could not be very capacious for that number of inmates, nor the ceilings as high as desirable. Four children were attacked,—three survived.

The school-house at which the children of Union City have for many years past been prepared for precocity and premature graves, is as faulty in a sanitary point of view as can readily be found. It is exceedingly probable that four or six hours session in such rooms by day, and the unavoidable association of children so circumstanced with the consumptive mother, had its influence,—as the location of the dwelling is quite distant from that portion of the town in which the cases were most numerous and generally most virulent, and would, I think, be considered healthy.

The number of interments between April 27 and October 31, *inclusive*, 1876, from diphtheric diseases, at the cemetery at Union City, was 20. Dr. Ewers believes that the percentage of deaths was small compared with the very general prevalence of the malady in its varied forms. He states that "nearly all of the cases presented decided catarrhal features;" "a few exhibited exanthems of dull color,—*none scarlet*," "The membranous exudation was by no means universal, and very many in which it was abundant and tough, recovered."

My time would not permit my visiting the dwellings and families which had been afflicted, to look after domestic causes.

It is a thriving village, with mostly an American population, intelligent and above want, with no crowded tenant houses, and with wide streets.

The most of the dwellings are high (20 to 40 feet) above the rivers, which flow with fair current along the east and through the south sides of the village.

The soil is gravelly loam of good depth, with subsoil of hard-pan neither excessively thick nor impervious. There is, however, running through the western and north-western portion of the village-plot a depression from 100 to 300 yards wide, which was doubtless once the bed of the Little Saint Joseph River.

Its deepest portions are now 25 or 30 feet below the level of the most thickly populated parts of the town, and at two places it is decidedly marshy. It is probable that about five acres of soil is saturated with moisture in the driest seasons of the year.

As there is no outlet, this basin or series of basins (for it is now divided by the embankments of several streets, through which no culverts or sluices have been made), must retain the drainage of about two square miles of land until evaporated by summer sun and winds. Of course the borders of such unavailable land will be, as it has been, utilized for the location of barn-yards, pig-sties, open-backed privies, etc., of a domestic nature, as well as for street drainage and depositories of garbage. A common delusion prevails in regard to the drainage by leaching through the gravel and sands of low lands, to wit: that if no pools of water or quagmires exist, the sanitary condition is good; whereas, such soils generally hold and hide organic matter in a state of partial decay, with sufficient of moisture to be vaporized when the season of elevated temperature arrives, bearing with it the mischievous load to be again condensed when spread over cooler soil or met by cooler winds, depositing its subtle gases, spores, germs, cells, or ova at considerable distances from their source. People are quick to grasp the idea that impurities are separated from water by filtering through a few surface inches of soil and with overweening confidence dig wells for family use upon the verge of a depository of filth, and neglect to ascertain whether the said impurities are rendered innocuous, or are temporarily left to be revived in more deadly forms by other conditions. Although the first deaths from diphtheritic disease did not occur in the *immediate* vicinity of this broad, ancient ravine, we were informed that the greatest number of cases in proportion to the population occurred upon its banks or border; and at the time of my visit there were severe cases of typho-malarial fever in the same localities, but mostly upon the east or south-east side. During the last twenty-five years Union City and vicinity has been several times invaded by zymotic diseases of great virulence.

Epidemic diarrhea, dysentery, and paludal fevers have raged with severity unob-

served in sections of the country which possessed no advantages, except the absence of the old river bed; and still the people, "submissive to the afflictions of Providence," have never drained the marshes, nor ceased using the slopes for the purposes before mentioned.

It is to be hoped that this last hideous form of penalty may arouse them to *sanitary sanity*.

I am happy to state that the people of Union City have voted to supplant their old school-house by a new and capacious edifice; and to erect a ward school-house upon the left side of the St. Joseph River during the present year; also that influential persons are working to secure thorough and perfect drainage for the afore-described marshes and ravine.

Two cases of diphtheria terminated fatally at the house of Mr. Fellar, about four miles south-east of Union City, on the road to Coldwater. I called at the house at the time above stated, but could not find in the *immediate* locality any suspicious condition.

The soil for sixty or more rods surrounding is sandy and dry; the well appeared right, and from previous observations I am confident that the family were cleanly in their arrangements and habits. About half a mile south of the house is a *shallow* mill-pond, with a dam a little west of south about the same distance off.

I think that the house is not more than ten feet above the ordinary low-water line of the pond, and no bluff or high land intervenes.

The vicinity has from its earliest settlement been markedly malarious, but was healthy at the time of which we write.

On the 4th day of July, Mr. Fellar, with his wife and little girl, about 6 years old, were at Union City, but were not aware of exposure to any contagion.

There were then many rumors in regard to the epidemic, as it was called; but its contagious character was but little suspected, and few, if any citizens exercised any caution in regard to it.

The sexton's record of burials from diphtheritic disease shows five from May 6 to July 3 inclusive.

On the 10th day of July, Mr. Fellar's little girl was taken severely sick, and died on the 16th.

Mrs. Fellar was attacked on or about the 14th, and died on the night of the 17th, or morning of the 18th. No one doubted the contagious influence.

Several ladies who were diligent in their heroic attendance upon Mrs. F. and her child, were within a short time attacked, more or less severely, with the characteristic symptoms. Several children who had been thus or similarly exposed, were sick in like manner. Mr. Cobb, living about three-quarters of a mile north-west from Mr. Fellar, lost one child in August of the same, and another, attacked at about the same time, lingered until about Christmas, and then died.

In the neighborhood of Mr. Fellar I think that there are no two dwellings that are less than 40 rods apart. I could not learn that there were any cases in that vicinity that were not traceable to *idio-zymosis*. After that of Mr. F.'s little girl, and the period of that attack after the visit to Union City, and the liability to unknown exposure on a national holiday in a populous town, creates a strong probability of contagion in that instance.

If the people who were so severely afflicted in and about Union City could have feared the end from the beginning sufficiently to have exercised rigid *quarantine*, much sickness, suffering, and many premature deaths would have been avoided; and, if the money and labor which have made the great blemish upon their otherwise beautiful location worse instead of better than in its natural state, had been expended in drainage and purification, large amounts of money and much sorrow would have been saved.

Very respectfully submitted,

Coldwater, Mich., March 3, 1877.

J. H. BEECH, M. D.

REPLIES BY J. M. SWIFT, M. D., OF NORTHVILLE, MICH.

DEAR DOCTOR:—Yours of the 15th inst., with request for history of first case of diphtheria, is received. I am unable to fix upon any case as being the *first*. There have been for nearly two months many cases of sore throat with diphtheritic appearances, and about the same general *malaise*. At first there were no *severe* cases. Perhaps a month ago, two cases in one family died,—young men, aged 21 and 23, respectively. The whole family, three other persons, suffered from it, and one of these (a girl about 12 years old) had it severely.

The first case I did not see, and it was treated by another physician of this place as a severe case of tonsillitis. The father, mother, and remaining son were suffering somewhat, and the girl referred to *very much*, at the time of the death of the first case; and I was then induced to visit the family, about four miles from town. These cases were soon convalescent, and fully recovered, except the son. He helped "cut a bee-tree," took violent cold, had severe chill at night, followed with fever, swelling of tonsils, general tumefaction, and almost entire closure of his throat. The neck on both sides was greatly swollen, and the fauces, tonsils, and a portion of the mouth covered with thick pellicula, which at first was in detached patches, but soon confluent. The inflammation was extensive, affecting the entire nasal and eustachian passages. The membrane shortly became gangrenous—soon phagedenic, with sloughing of the tissues, and death on (I think) 5th day. This case was regarded by those who saw it, as identical with that of the brother who died first. I am not aware that any other severe cases have occurred in that immediate neighborhood. There has been only one other family in which this terrible form has been developed, and that is in the village. There are at this writing two cases of similar type to that described above,—one a girl of 12 years, who seems now to be recovering slowly, with deep but *healthy ulcers* in the fauces and increasing appetite, abnormally *slow* pulse (about 50), some cough, and great prostration; the other, a boy of 7, with the same frightful condition of sepsis, and having had same prodromus, except that it was much slower in the successive stages. Another case in this family (and the 4th in order) took the bed yesterday, and the symptoms give promise of same terrible type. The families, as you will see, are miles apart and have had no communication. Among a hundred cases (slight and severe) these two are the only families where such grave symptoms have appeared. I am unable to find any answer to your question: "Can you trace its spread?"

Northville, Mich., Jan. 16, 1877.

J. M. SWIFT.

ADDITIONAL REPLIES BY J. M. SWIFT, M. D., OF NORTHVILLE, MICH.

Secretary State Board of Health:

I can communicate only a few additional facts relative to diphtheria.

One of the dwellings where the severe and fatal cases have been, is an old and decayed log house, low down on wet ground, an eminence in a swamp district. Here there were five cases, with two deaths.

The other is a good frame house, but it stood lower than the street in front, the water-table being in contact with surface of earth on one side, and only a little above it on the other side. The living-room is on the first floor; the cellar is damp, and the under surface of the floor somewhat moldy. Sanitary conditions otherwise are good. Here there were five cases, with two deaths.

Another house is good, with dry, gravel cellar, in a dry and high locality, but filthy, poor people; the water-supply is a natural spring used by a large number of families, but among them are no other cases. Here are two cases; one is dead, and the other is likely to die. This family did washing for the last-named family, and I doubt not, infection was communicated by the large amount of filthy bedding and clothing which was washed; four of these washings were done there.

In another family there were five cases, all of which recovered, except one, and that promises well. Four of these were very bad, and very putrid. The building is an old hotel, much decayed, low down on the ground; the paper on the walls is moldy in many places from leakage of roof; there is much decayed matter all about, and other sanitary conditions are not very good.

These all, except the first named, are in the village; the soil is dry in the main, a nice gravel subsoil. All cases lived on the ground floor. The water-supply I believe to be wholesome; there may be special exceptions; I do not know.

There have been multitudes of milder cases, and almost everything has been diphtheritic in character; only those mentioned have been "*awful*." There has been another death, that of a child, said to have been from diphtheria. I did not see it. The house is new, and I am inclined to believe the sanitary conditions good.

These cases have mostly lingered from two to four weeks; in those who died, two were entirely relieved of throat symptoms; there was gradual sinking of vital powers—pulse down to 40 per minute; in one, lungs involved seemed to cause death; in another, the bowels; kidneys ceased to act in four cases,—almost total suppression of urine.

I incline to the notion that *ferment* in the blood and disorganization of the same is the real difficulty.

Hastily and truly.

Northville, Mich., Feb. 10, 1877.

J. M. SWIFT.

REPLIES BY O. MARSHALL, M. D., OF NORTH LANSING, MICH.

Secretary State Board of Health:

DEAR SIR:—The following are the symptoms of the disease which I have given in the weekly reports, as influenza. Patients are taken with a feeling of weakness, or exhaustion, followed with chills or chilly sensations on exposure to slight changes of temperature, alternating with flashes of heat. When covered warm in bed, heat of surface of the body decided, on examination with the hand. Temperature in the axilla 100° to 103° . In the adult the average pulse is about 100 per minute. Fever lasts from one to three days, and ends with perspiration. There is generally nausea, and in some cases vomiting and purging; many have severe pains in the abdomen. The throat is more or less inflamed, particularly the posterior part of the pharynx, with a tendency to extend to the lungs and bronchial tubes. The nasal passages are not generally affected. The glands of the neck below the ear are swollen and tender. Three or four of the cases have had small diphtheritic patches on the tonsils. All have had cough, with mucous expectoration, and several have had pneumonia, as a complication. There has been one death, in a child sixteen months old. This child was treated by Dr. B. for two or three weeks before I was called to see it. There was extensive suppuration in all the parts of the throat. It finally died from suffocation. At one time in this case, there was slight deposit of false membrane. Dr. H. B. S. saw it about an hour before its death and thought it was a regular case of diphtheria, which may be so. I was more inclined to think the cause of death arose from swelling, or inflammation of the epiglottis, and not from false membrane, as inspiration was difficult while expiration was easy. I lanced the tonsils and posterior part of the pharynx and found abundance of pus. I think it was pus he saw, and not false membrane. However, I am inclined to the belief that the disease is akin to diphtheria, and in all those cases where there was any show of false membrane, I have reported them as diphtheria. All the cases of pneumonia reported in the last three weeks were caused by this disease. One case is given as diarrhœa, where purging was the most prominent and long-continued symptom. There was no eruption in these cases, although this week I have two cases of scarlatina in children, who were sick with influenza a week ago.

It is only the more severe forms of the disease which I have seen. The mild cases generally have no physician, consequently my reports cover only a small portion of the cases.

The only cause acting generally to produce an epidemic, at the present time so far as can be accounted for, is the low state of the water in the wells in this locality, and the necessarily bad quality of the well-water.

Respectfully yours,

O. MARSHALL.

North Lansing, Mich., Jan. 24, 1877.

ADDITIONAL REPLIES BY O. MARSHALL, M. D., OF NORTH LANSING, MICH.

Secretary State Board of Health:

DEAR SIR:—Your letter of Feb. 14, making inquiries with regard to diphtheria cases was received, but business engagements have prevented my answering before to-day.

I would decide a case to be diphtheria whether there was false membrane upon the palate or other parts of the throat or not, if there were other members of the same family sick with the disease, and they had deposits of diphtheritic membrane; provided the patient had other prominent symptoms of diphtheria but no membrane.

In reporting to the Board of Health, I have given only those cases where there was false membrane as diphtheria.

The first case I saw, the patient had made a visit to Chicago, and on his return he made a visit to my house while his throat had false membrane. Soon after, my whole family of five persons had sore throat with fever; two of them had decided deposits of diphtheritic membrane. The gentleman had visited a family in Chicago who were sick with diphtheria. D. W. Van Anken's family, who live across the street from my house, are just recovering from severe attacks of the disease. They all visited my house before they were sick. Forty feet is the nearest well to a privy in any of the cases which I have attended.

I have given you before all I have to say about the quality of the water in this part of the city. In my opinion, the whole of North Lansing is in an unsanitary condition, and will remain so until the city Board of Health take the clearing up of the city into their own hands, instead of waiting for the people to notify them where nuisances can be found.

The cellars are nearly all damp and mouldy, and, with few exceptions, are provided with drains to carry the water off in wet seasons.

The soil is generally clay, and so wet that many houses have no cellars.

North Lansing, Mich., Mar. 3, 1877.

O. MARSHALL.

REPLIES BY LEARTUS CONNOR, M. D., OF DETROIT, MICH.

DEAR DOCTOR:—Your card is received. As to the tracing of diphtheria to its cause here in Detroit, just now, I am prepared to say that I am ignorant of any practical method. It occurs in isolated cases in all grades of society, and in very widely separated localities. Still, I will think of the matter and perhaps I can see some new light. Should any practical method come to your notice, please inform me.

Your friend,

Detroit, Mich., Jan. 27, 1877.

L. CONNOR.

REPLIES BY J. M. LOOP, M. D., OF PORT SANILAC, MICH.

Secretary State Board of Health:

DEAR SIR:—In reply to your inquiry of the 19th inst., respecting diphtheria in this locality, I would say, that I regard the disease as epidemic in its character, and not due to any want of proper sanitary measures; and, too, the disease has been of such sporadic character that it could hardly be regarded as an epidemic. The cases reported have not been very numerous, but have extended over an extent of country equal to an entire township. There seems to have been since early winter, a great tendency to throat diseases all along the lake shore, and back into the country six or eight miles.

The disease commences as an ordinary sore throat, in the tonsils and pharynx, and, in the severe and fatal cases, extending into the larynx and trachea, presenting all the characteristics of membranous croup. Port Sanilac is a small and very healthy place, consequently my medical practice is mostly in the country. Doubts may be entertained as to these reported cases being genuine diphtheria, but I am not prepared to give any other name.

The weekly reports which I have sent you are of cases which have occurred mostly in the country.

Very respectfully,

Port Sanilac, Mich., Jan. 23, 1877.

J. M. LOOP.

REPLIES BY E. P. CHRISTIAN, M. D., OF WYANDOTTE, MICH.

DEAR SIR:—Yours of 24th duly received. In reply:

First, I cannot trace the first case to any contagion. I regard the disease as very slightly if at all contagious. I cannot now go into detail of all my reasons for coming to this conclusion, which are, however, satisfactory to me and founded upon an experience lasting from the first appearance of the disease in this locality, about fifteen or sixteen years ago, at which time we had a most malignant epidemic. I can not trace the disease to any definite origin, but have believed for a long time that drinking-water has some connection with it. Our water here is all surface water collected in comparatively shallow wells. I have no evidence that the disease is aggravated by unsanitary conditions except in so far as such conditions impair constitutional vigor and capacity for resistance of disease.

The particular case to which you refer, was surrounded by exceptionally favorable sanitary conditions. He was keeper of one of the light-houses in the river. He drank the water from the channel of the river or from deep water; his personal habits and surroundings were cleanly. He was in the habit of going to and from the light-house daily, and may have been exposed to contagion, but the probabilities are against it.

I have nothing but surmises as regards origin, nature, etc., of the disease, which require careful observation and study. But I am persuaded it is the least contagious of the so-called contagious diseases.

Yours very truly,

Wyandotte, Mich., Jan. 29, 1877.

E. P. CHRISTIAN.

REPLIES BY R. F. STRATTON, M. D., OF ST. JOSEPH, MICH.

Secretary of the State Board of Health:

DOCTOR:—Yours of the 25th inst. is received. We have had a little sore throat lately. I regard it now as connected with and dependent on the epidemic of scarla-

tina. In the same family they will report cases of both. In Chicago the papers report deaths in the same family within a few days, some of one and some of the other disease. Like scarlatina, it has been quite light.

My only fatal case within a year was a girl of eight, and last September. The disease ran a rapid course. There was a false membrane. The girl had lived six months in town, two years on a farm. The ground on farm was level and wet, inundated or quite covered with surface water during the wet season. The wells were shallow; and quite full of surface water. There was no drainage around or under the house. In town the lot was low; the soil, clay. The family got their water across the street. This well is thirty feet from the front, under the stoop which enclosed the kitchen door. Slops are thrown near the well. The well is dug in the clay, not through it. It is 18 feet deep. Clay here yields very little water, so the well is fed by drainage from the soil above. The privy is 100 feet in rear. The inclination of ground is a little from privy to well. The house where this child died was dry and comfortable, and the family cleanly. It had no cellar or drainage. There was dampness under the house during the wet season. All lived on the first floor.

I will inquire into the surroundings of other families who suffered from diphtheria, and if I find them of interest, will report.

Very respectfully yours,

St. Joseph, Mich., Jan. 29, 1877.

R. F. STRATTON.

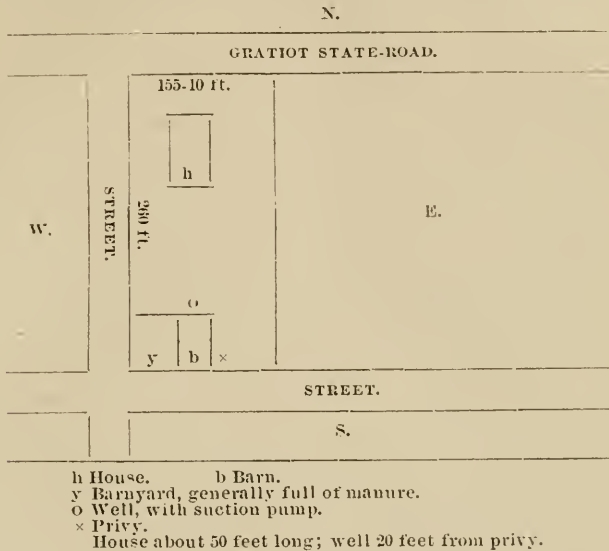
REPLIES BY N. D. LEE, M. D., OF SAGINAW CITY, MICH.

Secretary of the State Board of Health:

DOCTOR:—I have not made any special investigations into the probable cause of the disease in each particular case, although I did do that quite thoroughly a few years since, when we had it here in an epidemic form; and then, as now, came to the positive conclusion that it came from bad water, sewage, cellars, bad ventilation, dampness under the houses and surroundings, and improper and insufficient food, etc., with depressed condition of the system from malarial poison, etc. We had the diphtheria this Fall and Winter, in a very light form, with the exception of one or two cases, which were the last I had or heard of, about the time I reported. The cases that I saw were taken in this way: for some days a languid, tired, and depressed condition of the system, with loss of appetite, with cold shivers (sometimes decided shakes), with a gradual coming on of fever of an intermittent type, which increased in violence with each day, and with the coming on of the fever begun (generally) an inflammation of the fauces and soft palate, with some enlargement of the tonsils, with one or more gray patches upon them, which, when properly treated, seldom went any further. Physicians here are so familiar with that kind of intermittent fever, that they call it an intermittent fever with a vitiated condition of the system, from above-mentioned causes; it is generally easily controlled when understood and when proper treatment is had in time. Persons having this disease will very often make no complaint of sore throat, and will be surprised when you tell them of it; and physicians not detecting the disease in its incipency by external symptoms, will often have a very bad case before they know it.

I will now proceed to answer your questions as nearly as I can, and will use the worst case I had, which is nearly a typical case. It is a female. Her name is J. P. (French), aged about eighteen years, stout, robust habit of body. Her mother died of consumption when she was a babe (I attended her). She attends school at the Central Union school-building, with about six hundred more; the school-building is one of the largest and best in the State; she lives with her father, on outlot No. 21, Binder and Seyffardt's addition. There is no sewerage in that vicinity, excepting what is made by throwing up dirt into the middle of the street in grading it. The house is quite a large two-story frame building, well finished; it stands about three feet from the ground, which is dry ground and sandy on top; it has a cellar and cistern under the kitchen part; the under space is enclosed with matched flooring; in the cellar they keep all kinds of vegetables. I did not examine it, but all cellars here are damp, unless thoroughly drained; this has no drain. The top soil is clay loam, with a little sand, the subsoil what is called hardpan; it is not blue clay; it is cut up in cube form with water-space between each cube-like piece; this water-space in the clay is lined (or the clay rather) with a smooth substance whiter than the clay itself. It is a great query in my mind whether this covering of the clay in the water-spaces does or does not prevent the clay from purifying the water passing through it; the water I know will run through it rapidly in any direction, and does not materially soften the clay adjoining the water-spaces. You can dig a well here, and it will not soften enough to cave in below frost line. I know, by actual observa-

tion, that after a long dry spell of weather, and in the spring, after the frost is out of the ground, the rain liquifies manure about our barns and privies so that it will pass through this clay into our wells fifty to one hundred feet away, in very large quantities, in proportion to amount of stock kept on the block. The house of P. is situated about twenty feet from the front line, north side (see diagram); the barn, about



twenty by thirty feet square, on the south line, about fifty feet from the west line and street; it generally has one or two cows and two or three horses in it. The well is close to the north side of the barn (where the cows and horses stand); it is a spring (so P. says), and is only 7 or 8 feet deep, always full of water. I do not know of any drain excepting through the ground. The privy is 20 feet from the well, close up to the east side of the barn, and is never cleaned out. The patient lived on the first floor and slept on the second floor in a good large room. The personal habits were cleanly. I found J. quite sick, with well-marked symptoms, all of the back part of her mouth, throat, and tonsils very much inflamed, large gray patches on tonsils, very high fever, some swelling of the neck, sublingual and parotid glands. She was well in two weeks.

As to tracing the first case in this vicinity to any source of contagion or origin, I do not know that I saw it, and physicians do not report their cases; but as the cases were generally widely separated, I attributed the cause in *all* cases to *unsanitary conditions*, as above indicated in P.'s case.

In a general sense (not special, I have not the material for making special or chemical examinations), there is evidence that the disease was aggravated by unsanitary conditions; for it always commences in some filthy locality, as far as my experience goes, and we have had it here several times in its worst forms. I have a notion, and it may be only a notion, that the poison from horse or cow barns, is quite different from that of a privy; that the former has a greater tendency than the latter to produce *diphtheria*; and that the latter has a greater tendency than the former to produce *typhoid* fever. I shall try to find out the difference, if any, if I can.

You say that one of your correspondents suggests that the low condition of the water in the wells of his locality has some relation to the throat trouble. I think it has a very near relation; as the water in the wells goes down, they (the wells), form reservoirs for all surrounding spaces; and when there is but little water, the poison becomes more concentrated, and, consequently, you get more poison in using the same quantity of water. If there be infusoria (I have no doubt there are), they will be located in the water near the top, where it is warmest, and when the water settles to the bottom, you will get them in quantities; whereas you got but few, if any, when the well was full. I believe this will hold good as to the poison from a privy, whatever that may be; but the solution of manure and urine from a horse-

barn seems to pass through our clay almost in a pure state, with its taste and smell, as I have seen in many instances, and saturates the well-water, from top to bottom; and if it generates infusoria, they too, will be at the top, and you may use out the homeopathic solution of manure with a pump, and get no harm, until you get the top of the water and infusoria to the bottom, in a hot, dry time; when the poison is from a privy, or sewer, you will get typhoid or typho-malarial fever sure, and perhaps diphtheria; when from a barn, you will get diphtheria sure, and perhaps typhoid fever. I do not pretend that these are positive facts, for I have not the means, nor have I had the time to investigate. You have my general opinion, after examining these things for many years, for my own special benefit.

In my last report to you on Saturday last, I made mention of a case of dysentery; this case was in a house and grocery-store, combined; the patient, a woman, lived in the back part; the house has, for the last fifteen years, always had a great deal of sickness in it; it has a cellar under it, with a well in the cellar, or had. It also has a well twenty feet back of it, sixteen feet deep. I believe twenty feet from it is a privy, where all the people in the house and store, and a saloon adjoining, frequent. This case was well, and six months pregnant when she moved in. The bed-room she used was across a large room (not used) from the living-room, one window in it, never opened—of course poorly ventilated. Soon after she moved in she began to feel languid and very tired, or depressed, which was soon followed by very frequent mucous discharges from the bowels, which was in a few hours followed with large quantities of blood with the mucous, with great tenesmus, and tenderness over the region of the decending and transverse colons, with incessant vomiting, and very high, but intermittent or rather remittent fever. I was called. I had the house ventilated, a stove put in her room, regulated her drinking water, gave her some medicine, and she is getting well. This house has always had a great deal of sickness in it. Cause: privy, bad well and cellar. The owner has lost three children in it, moved his family out three years since into a healthy house; very little sickness since. While we are on this barn and privy topic, I will [see diagram] refer to the Frenchman, P., again. He married his second wife about the time he moved into this house; he and his last wife are very stout and hardy people. After the first baby, the wife had mammary abscess, was treated by a quack, and lost the left breast entirely. The babe struggled along on the right breast and cows' milk,—it lived. In 18 months she had another, followed with abscess of the right breast; the child was put on cows' milk and water, but it dwindled away and died. I was called just before it died and told them the cause of their trouble, but they could not see it. They had another child, she had no milk of her own for it, and fed it cows' milk and water, and other truck. It died. She has had three since and they are all alive, but had a very hard time of it until about eight months old. She kept them on cows' milk, water, lime-water, and sugar. When they were eight months old they weighed no more than when born. She (Mrs. P.) would persist in using the water from their well in the children's food, and the cows drank it also. I have no doubt the trouble with her breasts and the children, all came from their well. These are a few of many cases like them.

Respectfully yours,

Saginaw City, Mich., Jan. 31, 1877.

N. D. LEE, *City Physician.*

ADDITIONAL REPLIES BY N. D. LEE, M. D., OF SAGINAW CITY, MICH.

Secretary of State Board of Health:

DEAR DOCTOR:—I have been a little slow in making my report this week. I have two quite bad cases of diphtheria in my own family, which, with my other patients, has kept me very busy. You perhaps remember my report to you, a few weeks since, upon diphtheria, and in that report I mentioned a Frenchman's daughter having it quite severely, and I sent you a rough diagram of his premises. Well, she has it again, but not so hard as before; but she has a sister younger, who has it very violently; they are better, and I hope will recover. The Frenchman begins to think now that there is something in bad water. In my own case, on the block on which I live, we have built seven privies (the block is 240 feet square), and four barns, in the past few years; and as these have increased, I have thought that the water became impregnated with something that made it very unhealthy in dry times; especially when our wells had but little water in them. In the first place, we had in our house typhoid fever, nine years ago. Two years ago, my son Wallace, seven years old, died with cerebro-spinal meningitis, and at the same time I had a congestive chill, which seemed to leave its effects mostly upon the brain and spinal cord, from which I was six months in fully recovering. I believed then, and do now, that bad water

was the principal cause of the whole trouble, so I concluded to try and improve my well. I had the wall (brick) all taken out, and the well made deeper—making it sixteen feet deep from the top of the clay. I then widened the well down ten feet from the top, leaving there a shoulder wide enough to build my wall on and two or three inches of cement behind the wall. I laid my brick up in water-lime, and filled in solid between the brick and clay with the same. We have had a well nearly full of what appeared to be good water ever since, until the dry weather this winter, when the water in the well became low. I noticed that my son, aged 17 years, and daughter aged 14½ years, and also my wife, began to complain of feeling tired and unwell, and gradually grew worse. My wife was sick in bed a week, with something like an intermittent fever—got better, but not well; then the children caught cold and were taken very sick with all the constitutional symptoms of diphtheria, which on the second day made its appearance in their throats, and I have had a lively time, with great anxiety for them, since last Friday; but I hope now that they are better. The children have been in the habit of drinking water at their meals; they have used a great deal more than my wife or myself. In my barn, about fifty feet from my well, I keep a pony; that is all I have in the barn except a few chickens. My privy is 70 feet from the well; they are as far from the well as I can get them. I am in a great deal of trouble to know what to do for water, but think I will try to use rain water if I can get it properly purified. I would like it very much, if not too much trouble to you, if you would let me know if you have any thing, or plan in your office or experience, that will entirely or nearly purify rain water. Have you anything better than the old plan of filtering it? I want to get at the best way of cleansing it, not only for myself, but for many of my neighbors; for it seems to be impossible to get good water in any other way, at present. We have water-works in our city, but the water is taken from the river, just below where several sewers empty into it, and these sewers not only carry off the washings from the surface, but from hundreds of privies and barns; and a penny wise and pound foolish common council will do nothing to remedy the evil, because it will cost something. My neighbor on the opposite side of the street, built last fall, a little stable for a cow and horse; it is 70 or 80 feet from his well; privy 100 feet from the well. He has four children, all sick with sore throat but not fully developed diphtheria. I believe Dr. White attends them.

Respectfully yours,

Saginaw City, Mich., March 14, 1877.

N. D. LEE, *City Physician.*

REPLIES BY JNO. P. WILSON, M. D., OF PONTIAC, MICH.

DEAR SIR:—Yours of Jan. 26, making inquiries concerning diphtheria reported by me, was duly received. There have only three cases occurred during the winter, that can be fairly designated as true diphtheria. I reported the disease simply because it existed. None of the cases fell under my own observation. We have had a considerable amount of sore throat, with patchy exudations on the tonsils, with some depression of the system, but yielding readily to proper treatment. These latter cases, I have no doubt, constitute the "lots of diphtheria" some of our physicians are meeting here. Of the three cases of the true disease, I have made what inquiry I can, and have obtained only partial data for only two of them.

Case No. 1 was a little girl, on a farm near the town, having ordinary farm comforts, tidy household, etc., but living and sleeping over a cellar filled full of apples, potatoes, and ruta bagas. She recovered and no other case occurred in that family, or in the neighborhood. Per contra, there is another family in another locality, living over a cellar full to the brim with ruta bagas, so that on entering the house, the characteristic, rank, sickening smell of that root is scarcely endurable; but the children have all been well so far.

Case No. 2, in this city: Family in destitute condition, and surrounded with all the essentials of disease; ill-fed, ill-clad, and filth in store. The privy is all of fifty feet from the well. She died, and no other case occurred there.

Case No. 3: A mechanic's daughter, living in moderate comfort, and subject to no special unsanitary condition, so far as I can learn; fatal after a week's illness. In my report for this week I dropped diphtheria from the list, as I do not think there is a case in the city, although other cases may occur in a similar way hereafter.

I regret the meagerness of the information given, but it is all I can furnish.

Very respectfully,

Pontiac, Mich., Feb. 1, 1877.

JNO. P. WILSON.

REPLIES BY W. H. ROUSE, M. D., OF DETROIT, MICH.

DEAR SIR:—Your favor of 30th ult. came to hand yesterday. By referring to my weekly reports you will find that "Diphtheria" is always followed by (?), unless inadvertently omitted; and if I mistake not sometime ago I stated that (?) referred to doubtful cases.

There has been quite a number of cases of sore throat, and quite a number of physicians (some of good standing in the profession) have reported these as diphtheria. In deference to such reports, I have given diphtheria (?) as one of the prevailing diseases in this city; but I have not seen a single case of this disease, and consequently I am unable to trace causes. I have conversed with a number of physicians in regard to the present throat difficulty reported "Influenza," and find my position in regard to it well sustained.

I have, for some time, been trying to ascertain facts in regard to this difficulty, and when anything worthy is definitely obtained I will report.

All the people here use water from the river; i. e., there are no wells. The land is level; and in the part of the city where most of my patients are, the houses are rather too near the ground. I have seen quite a number where the yards have been filled so that a cavity of 6 to 20 inches deep was under the house. In wet seasons quite a pond forms under the house and disease is the consequence. I have observed no connection between these ponds and our influenza.=diphtheria (?).

Yours truly,

Detroit, Mich., Feb. 2, 1877.

W. H. ROUSE, M. D.

REPLIES BY W. F. FISHER, M. D., OF MANISTEE, MICH.

Secretary State Board of Health:

DEAR SIR:—In reply to your letter of inquiry of the 30th inst., I would say that only two cases of diphtheria came to my knowledge. It was not prevalent as an epidemic, and when reported I did not understand the word prevalent to mean epidemic but existing.* The first case was a married man, who had lately changed his residence from Milwaukee, Wis., to this place. He informed me that when he left Milwaukee diphtheria was prevalent in that place. I believed the disease to have been contracted in that place; first, because the hygienic surroundings were good, he living with his family in the second story of a house located on an elevated hill, I should judge 60 feet above the water-level, and fanned at that time by winds prevailing from off Lake Michigan. Living in the house were two families,—in all, nine persons. No one of these persons contracted the disease.

The second case was a mild case, half a mile from the first; I could not trace it to any specific cause. To your inquiry regarding water, I would answer, generally, that well-water is almost entirely used, and that most of the wells are supplied by surface drainage. But few wells appear to have a spring supply. During the last 4 or 5 years most of the wells dug have been in accordance with my recommendations, viz: leaving a space between the brick or stone and the outer rim of the well, of 18 inches or 2 feet, this space to be filled with charcoal and coarse gravel. The result has been almost an entire banishment of "endemic diseases." The soil in this region, on which most of the residences of the city proper are located, is clay. Having never since my residence in Manistee had an epidemic of diphtheria, I cannot give you much information regarding its spread and control; but if such an experience should arise, I would be glad to furnish any information that I may acquire, and would be pleased to answer any inquiries regarding any disease or diseases, that may be asked for the advancement of medical science.

Yours respectfully,

Manistee, Mich., Feb. 2, 1877.

W. F. FISHER.

REPLIES BY ALFRED NASH, M. D., OF LAPEER, MICH.

Secretary of the State Board of Health:

DEAR SIR,—In reply to your inquiries concerning the history of the first cases of diphtheria and scarlatina in this vicinity, I thought the following account of their peculiarities might be of some interest.

On Monday morning, the 15th day of January, my first calls were to visit two

*[By the word "prevalent" as used in the blanks for weekly reports of diseases, and in the Circular "Relative to Prevailing Diseases," was meant not *unusually* prevalent, as some seem to have understood the word, but "present" in the locality.—H. B. R., Sec'y.]

families, living about six miles apart, in each of which I found a case of scarlet fever, aged two and three years, neither of whom had been out of their door-yards for several weeks, and no source of contagion could be traced. They both sickened within an hour of each other; had it rather mildly. The first family visited consisted of man, wife, two children, and hired girl. As the eruption was leaving the little boy, the hired girl came down with a well-marked diphtheria; she was sick two weeks, during which time the other child came down with scarlatina, and on the same day the father was prostrated with an acute attack of dysentery, which lasted for ten days. He was not at all subject to bowel complaints, and had made no change in his diet or habits. The well in this case was dug on a slight ridge; soil sandy. No privy, cistern, or other contaminating influence was near. A microscopical examination of the water showed it to be unusually free from organic matter or infusoria. Chemical tests, the solution of permanganate of potassa, failed to bring out any impurities. The cellar and foundation of the house were a little damp. The people were clean, tidy, and used well-cooked, wholesome food. The families occupying houses on either side of this one have had no sickness for the past six months.

Two years ago last summer, another family, occupying the same house, had scarlet fever, measles, and remittent fever, all intermingled, and each of a severe form. Two members of the family had scarlet fever first, immediately succeeded by measles, and running into a low, protracted form of remittent fever. One member of the family had measles first, then scarlet fever; while others had remittent fever first. The latter were adults. The cases were all severe. One little boy was left hopelessly deaf. The last visitation, however, has been very mild, excepting the case of dysentery.

The other family, visited the same day, suffered from scarlet fever three years ago, five children having it very severely, two of whom died; the remaining one, an infant, at that time escaping, was the one I saw on the 15th inst. The disease ran a mild course, and the child has made a good recovery. Since that date the disease has appeared in various families in this vicinity; in none, however, to my knowledge, in the village. The cases are all mild in character. Diphtheria is easily managed, and I think it is on the decline. I forgot to mention that the well of the family in which the first case of diphtheria and scarlet fever appeared was dry for some weeks last Summer.

Respectfully,

A. NASH.

Lapeer, Mich., Feb. 5, 1877.

REPLIES BY P. P. SHORTS, M. D., OF LUDINGTON, MICH.

DOCTOR:—In answer to your questions on diphtheria, I will state that I had during that week, but a single case. It was in a well-regulated family of cleanly habits. Their house is situated upon an eminence in a healthy part of town. Their well is a drive-well, in a sandy soil, situated about 60 feet distant from privy. They live upon the first floor, over a small but well-ventilated cellar, in which there is but little if any decomposing vegetable matter. I could not trace the cause to any unsanitary influence, and looked upon it as a sporadic case, having for its cause that which is identical with croup.

As to the cause of diphtheria, I must admit that I have not investigated it as I should have done, never being unfortunate enough to have to carry my customers through an epidemic. Still, I have always accepted the miasmatic contagious theory, and believe that much can be done by the administration of strict sanitary laws, to control, if not to eradicate the disease when present in a community. I see by health reports that it is prevalent in various parts, and fearing a visitation of it, I shall give the subject more thought and report to you any unusual peculiarities I may observe, with my own views upon any question touching the vital interests of my fellow man; and if in that way I can contribute to ameliorate in the least the sufferings of my fellow men, I will consider myself amply paid for all my trouble.

Yours respectfully,

P. P. SHORTS.

Ludington, Mich., Feb. 5, 1877.

REPLIES BY A. L. PADFIELD, M. D., ST. CLAIR, MICH.

Secretary of State Board of Health:

In reference to diphtheria as a prevailing disease at present in this State, I am about to express my doubts to you, in order that, if in error, I may be informed. I have always looked upon this disease as one, above all others, which assumed a regular migratory character; and I may have been strengthened in this idea mostly from

the fact that I have endeavored to discover a case of this disease in my practice for the last twelve years, and have been unable to satisfy myself that, in that time, I had met with a single case that I could with any degree of positiveness, declare to be an assured case of the disease; hence, I always fear (may be very wrongly) when I hear such cases reported, that the parties reporting them have, by the severity of the throat affection, been misled, and carelessly, not ignorantly, been induced to place the disease in the category of that terrible complaint, diphtheria. Fifteen years ago the disease passed through this section of the country on its way west, and its track was plainly and widely discernable. Since then, I must say, I have failed to meet with a case.

Yours, etc.,

St. Clair, Mich., Feb. 5, 1877.

A. L. PADFIELD.

REPLIES BY W. B. SOUTHARD, M. D., OF KALAMAZOO, MICH.

Secretary State Board of Health:

DEAR SIR:—In reply to yours of Jan. 30, 1877, I would say: I have not been able to learn that any of the first cases have been exposed to any contagion. In one family, in which there were two cases, there is a cistern under the floor of the living-room, and the water is drawn from the cistern with a pail through a trap door. The floor seemed damp underneath; aside from this, the premises seemed to be in excellent order. I advised that the cistern be removed. In another instance, there was a vault from which the privy had been removed in order to have an empty one. The old vault, with its contents, had been buried,—distance, 30 feet. I was unable to find any other condition about the premises that seemed to be unsanitary.

Respectfully,

Kalamazoo, Mich., Feb. 5, 1877.

W. B. SOUTHARD, M. D.

REPLIES BY W. C. WEST, M. D., OF MONROE, MICH.

DEAR SIR:—Yours of Feb. 2 is at hand. The first case of diphtheria that came into my hands—the latter part of October—was in a family just returned from a visit of some several months, in Buffalo. The family had been much afflicted—especially this little girl. The cellar under the house had been very damp, and several times filled with water from the city sewer, leaving it a filthy hole. Their continued sickness, which I attributed to the condition of the cellar and the nearness of the well to it and an old privy, caused them to make the visit. On their return the child appeared quite well. The house they then went into had a cellar without a drain until some two weeks before they took it. It had been damp, but then was in a much better condition. I can trace no source of contagion in this case. I at once found fault with the cellar. No other case has appeared in the family. Another family has suffered, the past year, typhoid fever, erysipelas, and last, diphtheria. I have thought a sewer-well, which emitted foul odors, was to blame. The well is probably 200 feet from the house. I can see no other cause, as the house is one of our best brick, the family very intelligent, and in every way cleanly. Others, as near or nearer, it is true, did not suffer. Our soil is a very porous, sandy loam, such that causes me to fear contamination more than 100 feet distant from a privy, especially during a wet season. The suggestion that the low water in our wells may have something to do with our sore throats is new to me. It may be. I have been tormented with sore throats more or less ever since I have been here—upwards of two years. The wells have generally been low. I have been attributing these throat troubles to the lake influences. It may be the water-supply. I am not prepared for microscopical examinations at present. We have not had much diphtheria in my experience—but much sore throat, etc.

Yours, truly,

Monroe, Mich., Feb. 7, 1877.

WM. C. WEST.

REPLIES BY JOHN S. CAULKINS, M. D., OF THORNVILLE, MICH.

Secretary State Board of Health:

DEAR SIR:—This is in answer to yours of Jan. 26, inquiring about diphtheria. Diphtheria was fatal about here four years ago, and since then has hung around in a mild form. I call by that name, any inflammation of the throat, with exudation in which I recognize the true diphtheritic smell.

I cannot trace the first case that appeared in my vicinity to any source of contagion or origin, and in no case have I positive evidence that the disease was aggra-

vated by unsanitary conditions. The same unsanitary conditions may often be found in the very mildest cases. At one house in which there were, in January, three severe cases, a mother aged 30 years, and two children, aged 4 and 6 years, the distance of the privy from the well from which the water-supply was obtained was about 10 rods. The children died. The soil was loam, with clay subsoil, the cellar was damp—almost wet. The cellar was under the living-room, and the floor was damp on the under side, and had mould growing on it. The patients lived on the first floor. The family are very neat and clean. Perhaps their treatment of the cellar might be open to censure. I doubt, from what I learned and saw of it, if it is as thoroughly cleaned and disinfected as yours or mine is.

The three did not all sicken at once, the mother coming down on Sunday, the boy (the youngest) on Wednesday, and the girl on the next Monday. The boy lived four days, and the girl eight. They had been nowhere to catch the disease, and there was none near. Two brothers of the mother were stopping there on a visit.

These were the worst cases of diphtheria that I ever saw or read of. Not only were the mouth and nose full of the exudation, but it came out on abraded places on the surface of the body, and in the girl's case, through the sound skin behind both ears.

Such cases do not afford much support to the doctrine of the local origin of the malady, at least it seems so to me.

According to my experience, it is more difficult to trace the source of infection in diphtheria than in any other disease.

I have since learned that the well is safe about the top from surface water. The father and a young child escaped the disease.

Regretting that I have nothing more definite to offer,

I remain, respectfully yours,

Thorntown, Mich., Feb. 5, 1877.

JOHN S. CAULKINS.

REPLIES BY D. W. C. BURCH, M. D., OF ROCKFORD, MICH.

DEAR SIR:—Yours of the 10th just came to hand in due time, and I will say in reply:

I cannot trace the cause to contagion. The disease was aggravated by filth, and surface-water. (The water-supply was a hole in the ground to hold the surface-water, and nothing more.) The soil was a high sandy knoll; the water, however, was obtained from the clay ground at the bottom of the hill. There was no cellar. The floor or under-floor was not damp or muddy. The family lived on the first floor. Their habits were uncleanly.

The above are answers that only cover the first cases that occurred in this vicinity. The patients lived in a rough double-boarded, or board-and-batten house, and it is my opinion that cold, exposure, and bad water were the cause of the disease.

The second severe case was in a family the same as above, except that they lived on a high clay knoll, and were exposed to the disease previously to the attack.

The third severe case occurred in a family who lived on low damp ground, otherwise the same as first and second.

The fourth was in a family who lived on a high sandy knoll in a good comfortable house; they were scrupulously clean, but used unfiltered rain or cistern water. (Cistern made of water-lime mortar and spread upon the natural soil after excavation.) In this family there were no fatal results. In each of the first three families, there were fatal cases.

Respectfully yours,

Rockford, Mich., Feb. 9, 1877.

D. W. C. BURCH.

REPLIES BY J. B. GRISWOLD, M. D., OF GRAND RAPIDS, MICH.

DEAR SIR:—I regret that I am unable to give you any information of value regarding the causes of diphtheria in our midst. I have had, in my own practice, no cases of diphtheria. I have had many cases of pharyngitis, with exudation, but no membranous formations, to my knowledge. I have had no deaths and no severe cases, and none have been reported either to the Grand Rapids Medical Society, of which I am Secretary, or to me. I have reported diphtheria in my weekly returns to you, because I would hear of cases; perhaps they were the same as my own cases. I can gain nothing reliable relative to bad water, or bad hygiene, and diphtheria.

Very truly yours,

Grand Rapids Mich., Feb. 9, 1877.

J. B. GRISWOLD.

REPLIES BY C. RUSSELL, M. D., OF HASTINGS, MICH.

DEAR DOCTOR:—Yours of the 9th inst. is at hand. In reply I would say that I have not been in the habit of calling a case diphtheria unless the diphtheritic membrane was present; nor do I call all cases of sore throat *with* white patches, *diphtheria*; yet I think that we may have diphtheria *without* the diphtheritic membrane in throat, and in three cases which were called diphtheria there was none; but there was an ichorous discharge from nose, causing excoriation and swelling of lip,—not severe cases, and which were regarded as the “catarrhal form” of Certe! The family in which these cases occurred lived some four miles from town. The first case I did not see; the patient was a girl of seven years. The family and the doctor who did see her assure me that the exudation was abundant. She died in about 48 hours, and within 24 hours after her death the father, and a boy of about 12 years, and a girl of 10 years, were taken sick; I found diphtheritic membrane in the throats of the boy and girl; a livid condition of throat with very slight exudation, in the case of the father. A girl of about four years, and one of nearly three years, and then the baby of 18 months, were taken sick. None of the last three had any membrane in throat, but they had the discharge from nose, of which I have spoken; the father and boy were very sick, the rest were not so bad, and all recovered. A neighboring lady was frequently in the house, and in a short time her baby died with diphtheria; so the doctor called it. As to the origin of first case, unless it was due to local influences, I can say nothing; these appear to me sufficient to produce most any disease.

With regard to impure water, I cannot say positively, but I think quite likely it had something to do with the disease. The well is close by the back door where all slops and garbage are thrown. I think there is no privy anywhere near. The soil is a sandy loam; it gradually slopes to west for four or six rods to a brook which runs through the barn-yard. There is no cellar, and the house is close to the ground; under the floor it is damp, and there is no ventilation; the paper on the walls in the room is damp and in some places mouldy. The patients were all in two adjoining rooms, kept very close and hot. Their personal habits were very uncleanly, and in all the disease was doubtless prolonged by these conditions.

One other case completes my list. A young lady, living 6 miles from town, came home sick from her school, 10 miles away, and had well-marked, though not severe, diphtheria. A few other cases have been reported to me, but I know nothing of the circumstances. As to control of the disease, I have never seen it controlled to any great extent. In above house, I used disinfectants, and what fresh air could be got into the house when I was there; at other times, I fear the supply was scanty. I will examine water from well as soon as I can get some.

Yours truly,

Hastings, Mich., Feb. 12, 1877.

C. RUSSELL.

REPLIES BY A. W. ALVORD, M. D., OF CLINTON, MICH.

DEAR DOCTOR:—Yours of the 8th inst. is received, and I hasten to answer your questions.

I cannot trace the first case of diphtheria to any specific source. I have no evidence of its being aggravated by unsanitary conditions.

Allow me to say that I hope you will continue to prosecute your investigations in this matter, and if in the future I can get hold of any facts that will throw any light on the matter, I will communicate them to you. At present I have none not usually known.

The personal habits of the patients are as varied as those of persons sick with pneumonia. The water-supply certainly furnishes no key to the situation here.

I might add one fact observed. Sporadic cases of diphtheria have occurred frequently during the warm seasons occurring in mid-winter, a time when melted snow and ice would flow into the wells more or less. The taste of the water is often changed by this process of melting snow and ice. Whether infusoria exist or not, I cannot tell.

I have the honor to be ever yours.

Clinton, Mich., Feb. 12, 1877.

A. W. ALVORD.

REPLIES BY HENRY L. JOY, M. D., OF MARSHALL, MICH.

Secretary State Board of Health:

DEAR DOCTOR:—I received your communication of the 15th inst. In reply I would say that I would like to take back my report of the 3d inst., so far as diphtheria is

concerned. I do not believe we have had a case of it. Having had quite a number of mild cases of scarlatina, I was easily induced to diagnosticate one case I had as diphtheria, and I believed I was right, from the fact that I heard of quite a number of cases called diphtheria, in the practice of others. I now think there has been no case of it. I do not regard any case as diphtheria that does not show that peculiar ashy layer upon the tonsils or posterior part of the throat, with great prostration of strength and offensive odor. Should any cases occur, I will attempt to find out its origin and other circumstances, and report as you desire.

Very respectfully yours,

Marshall, Mich., Feb. 19, 1877.

HENRY L. JOY.

REPLIES BY A. P. DRAKE, M. D., OF HASTINGS, MICH.

Secretary State Board of Health :

DEAR SIR:—Yours of Feb. 9 was duly received. In answer I would say that diphtheria seldom occurs in this city as an epidemic, but we are subject to sporadic cases at any season of the year, and have more or less of such cases every year. For the past twelve years I have endeavored to watch its course as well as I could; and where it has most appeared, I have seen nothing to lead me to attribute anything to the hygienic conditions. In fact, the most cases have occurred in families possessing the best sanitary conditions in the city.

So far, my observations have led me to the conclusion that it is more likely to appear in families of a serofulous habit, whatever the sanitary conditions. Another thing that has attracted my attention is that these same families are also subject to attacks of erysipelas of the face.

In this city, our water-supply is nearly all from wells that are dug, and free from sewage.

Respectfully yours,

Hastings, Mich., Feb. 20, 1877.

A. P. DRAKE, M. D.

REPLIES BY JOHN P. STODDARD, M. D., OF ALBION, MICH.

Secretary State Board of Health :

DEAR DOCTOR:—Your favor of the 25th ult. was received, and it was my purpose to answer you as soon as I could make the necessary investigations in regard to cases of diphtheria occurring in this vicinity. But the press of professional duties has for the past fortnight prevented my paying the attention to the matter I ought.

The first case of diphtheria occurred about two miles south of this village, and about the first of Nov., 1876. Without doubt the contagion was imported. The family in which the disease first occurred had a daughter visiting at Union City, in this State. She states that diphtheria was prevailing to some considerable extent in the neighborhood and country surrounding, at the time of her visit. She was taken sick there before completing her visit and came home sick. She sent for the family physician, who pronounced her illness diphtheria. She recovered, but all the other children in the family, and one adult came down with the disease. Two died,—a babe and an adult, a hired girl. Directly across the road lived another family where there were four or five children. The children, after about 10 days from the onset of the disease at the first house, came down with same disease, and with two fatal cases. The adults, and also the children, though not so much, had visited each other. Directly across the country, east just one mile, lived another family of young children. The parents of this family had often visited both of the first families sick with the disease. About two weeks after the second family fell sick this third family were taken sick. Some three or four children had the disease, but not very severely.

In the last week of December, a family in the village came down with the same disease, and one girl died. It is impossible to trace any connection with the former cases, unless it be that the physician who attended the first cases of this disease brought it into the family. While attending the third family, he was called into this family in the village to see a girl sick of what he called quinsy. After this girl recovered, others came down with diphtheria, and one died. It is my opinion that the physician may have brought the contagion into this last family.

The sanitary conditions of all these houses are good. The water is not low in any of the wells, and all were well-to-do families. The cellars were all dry, and three of the houses were quite new and of good construction. The families all lived on the first floor.

In conclusion: I think the first case was imported from Union City, and that all the other cases came from this. During the prevalence of these cases, there was an un-

sual number of cases of pharyngitis, and often small patches of diphtheritic membrane present, yet not of much extent.

Truly yours,

Albion, Mich., Feb. 17, 1877.

JOHN P. STODDARD, M. D.

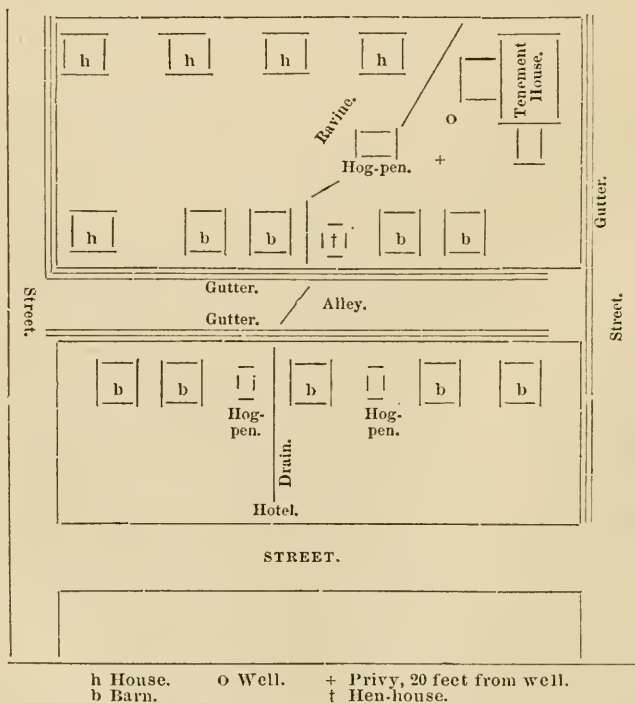
REPLIES BY E. N. PALMER, M. D., OF BROOKLYN, MICH.

Secretary State Board of Health:

DEAR SIR:—Yours of Feb. 9, in relation to reported diphtheria, is at hand.

I do decide cases to be diphtheria in which I do not find the diphtheritic membrane; but do not report such cases. If I have a case of diphtheria where there is fever, headache, furred tongue, constipation, difficulty of swallowing, a swollen, red, or purple appearance of fauces, palate, and tonsils, and on the second or third day, a whitish, or yellow white, or an abundant yellow, leathery exudation, or membrane, and others exposed to the contagion of said case or from the same causes, having sore throats without the membrane and not explainable from any other cause, I pronounce them diphtheria.

I can trace the first case that appeared in this vicinity to its source of contagion or origin. Case 1, Mrs. C., aged 33, widow, teacher of grammar department, high school, also teacher vocal music. I saw her Feb. 1 (Thursday), 1877. (She had been to Jackson the Saturday previous, where she visited a family where one of the children had sore throat;* it was quite sick but no physician had been called.) Symptoms: Fever, headache, difficult deglutition; fauces, tonsils and soft palate very much swollen. Quantities of a yellowish brown leathery exudation attached to tonsils and pharynx. The exudation began to clear off the fifth day, and by the ninth had disappeared. She is now convalescing, but there is left a partial paralysis of the vocal organs.



* DOCTOR:—In my answer to your communication of Feb. 9, in reference to diphtheria, etc., I mentioned that the first case here had been to Jackson previously to being taken sick, and visited in a family where there was sore throat. I have since learned, through her, that a physician was called the next day who pronounced the case diphtheria, and that two more of the family have since been quite sick with the disease.

Brooklyn, Feb. 22, 1877.

Respectfully,

E. N. PALMER..

In some cases there is evidence that the disease was aggravated by unsanitary conditions.

Case 1. She lives in a tenement house, as per diagram sent. Three families live in said house, two below and she on second floor; water stands in cellar at least one-half of the year. One family below (underneath her sleeping-room) are very filthy.

The water-supply is bad, the well being about twenty feet from privy, neither of them having been cleaned for the last twenty years.

Soil about six feet sand then clay, with a ravine running within ten feet of both privy and well (the privy being above the well). In rains or high water the water runs over the top of the ground, from the leakings of barns, manure heaps, hog-pens, and hen-roosts, as per diagram.

Her personal habits were very cleanly.

The water in well is quite low at present, or was at the time she was taken sick. I tested the water by Heisch's test, which demonstrated, what I already knew, that the water was largely saturated with organic matter.

Case 2. Miss R—, aged 17, a German servant girl, had been working in Manchester, came home sick; had the characteristic symptoms of diphtheria, including membrane. Talking was such a difficult task for her that I did not investigate the case as fully as I ought.

Following case 1, in the grammar department of the school, there were several cases of sore throat, but two, to my knowledge, having any signs of membrane.

In conclusion, I will say that, in my opinion, formed from my own experience and observation, diphtheria, if not frequently caused by, is at least increased in severity and fatality by impure drinking-water as well as impure surroundings. For instance, three years ago, during an epidemic of the disease in this vicinity, at Napoleon (four miles distant), where the water-supply is mostly obtained within six feet of the surface, with sand-rock beneath, most every case was fatal, while here and in the surrounding country the cases were not very severe and none, to my knowledge, was fatal.

In 1872 I had three cases in one family, all taken within two days. There were no other cases in the vicinity and the sanitary conditions seemed good, but on the second visit I discovered one of the family bringing water from well at barn. Inquiry brought out the following state of things: They had been using this water for about a month (the well at the house giving out), and the water was so impure from the soakings of the barnyard, that a person could smell it across the room after it had stood in the house an hour. Further investigation brought this fact to light, that the farmer had lost three horses within two years from throat disease.

The spreading of the disease, except where the morbid cause extends through a community, is caused, in my opinion, by *direct contagion* more frequently than in any other way. Children, being more frequently the sufferers, are often kissed by old and young, more so when sick, especially if dangerous, by friends and relatives, so the disease is carried from one family to another and from neighborhood to neighborhood, each new case forming a nucleus for a new spread, etc.

As to controlling the disease, all sanitary and hygienic, as well as disinfecting, measures should be put in force immediately; no kissing the sick should be allowed; all sputa, etc., should be thoroughly disinfected and removed as often as is necessary.

Yours respectfully,

Brooklyn, Jackson Co., Mich., Feb. 13, 1877.

E. N. PALMER.

REPLIES BY H. C. CLAPP, M. D., OF MENDON, MICH.

Secretary State Board of Health:

DEAR SIR:—In compliance with your request, I send you a statement of a case of diphtheria I had two weeks ago. It is an interesting case from its traceable connection with those cases I reported in my last annual report, under question 29.*

The 12-year-old girl there mentioned as having been attacked by the disease on December 1, the day her little brother died, did not convalesce well. The disease left her with a severe bronchial cough, which has continued, with lessening severity, up to the present time. The fauces, too, remained for a long time somewhat reddened and congested; and she was slow in regaining her wonted flesh. She was not allowed to attend school until Tuesday, January 30, and was seated with Lotta Worthington, a girl of about her age, the subject of this communication, and who commenced complaining with sore throat on her return from school Friday evening, the fourth day. I saw her Saturday morning, and pronounced the disease diphtheria.

* [See his replies to Circular 15, page 220 of this Report.—H. B. B., Sec'y.]

The parents thought she had taken cold, as the walking was sloppy. Three of the other children, one younger and two older, attended the same school and walked the same road, and all are well. Query: Did she take the disease of Mary Hahn, the girl she sat with, who had the disease the first week of December, and who, up to the present time, has been troubled with the bronchial sequela, or from her clothing? Or is the attack of Lotta and her sitting with Mary a mere coincidence?

There had been a number of cases, in the neighborhood, of simple pharyngitis from cold, but the intensity of the initial fever, the nervous trepidation, the suffused lividity of countenance, the unusual swelling of the lymphatic glands and tonsils, the excessive diphtheritic exudation, and the peculiar offensiveness of breath in this patient, seem to me to preclude the possibility of a mistake in diagnosis.

Against the theory of *local infection*, is the exemption of the other children, the cleanliness of the surroundings, the cellar being well lighted, aired, and clean, the well, 28 feet deep, bricked up, with a pump in it, and being 88 feet from the privy, and the well-ordered condition of everything in and about the premises.

The patient was perfectly isolated from the rest of the children, and no other cases have occurred in the family.

Since writing the above, I have been called to Mr. Worthington's, and found three of the other children down with diphtheria, a *nursing* babe, an eight-year-old boy, and a sixteen-year-old girl; but the attacks are *mild*. Lotta was permitted to leave her room on Saturday, February 10, and they were taken February 18 and 19.

I am not as yet satisfied that there is any particular connection between the water-supply and diphtheria; for it occurs quite as often in families that use pure water and plenty of wholesome food, and the sanitary condition of whose dwellings is apparently perfect. The same, in my judgment, might be said of scarlet fever, and most, if not all, of the contagious exanthemata. If the cause be originally local—from stagnant pools and hotbeds of vegetation and animal decompositions, as witnessed this present Winter in the engorged aqueducts and sewers of Chicago, which fill the air with noxious vapors, if not with infusorial or bacterial germs,—it certainly appears to become atmospheric and general, from the fact of its attacking the well-fed and the cleanly in perhaps an equal proportion with the impoverished and filthy, and therefore is *epidemic*. But bilious fevers, including cerebro-spinal meningitis, which I think is a bilious disease with a certain determining exciting cause, and perhaps typhoid fever, although produced by a specific poison, *sui generis*, are more frequently, if not generally, caused by impure water; the contamination of the blood thereby being evident from the peculiar prodromic symptoms of those diseases,—consequently they are usually *endemic*.

In a north-west suburb of our village, is a tenant-house occupying a strip of land between a small lake without visible outlet or inlet and a millpond, the distance between the two being about 20 rods. The water of the lake is always of the same level with that of the pond, showing an underground communication. The well of this house is sunk at about the centre of this peninsula, is only some ten feet deep (the depth of the village wells is about 20 feet) to the surface of the water, and as nearly as I could determine, the water in it is on a level with the surface of the two lateral bodies, rising and falling with them. The water corresponds very nearly, in taste and color, to that of the ponds. The privy stands about 10 rods from the well, on the banks of the millpond, and discharges its contents into it. When I first came to Mendon, in 1860, a doctor lived in this house, whose wife and daughter—the only other members of the family—were sick most of the time. Since then there have lived there eight different families, two of which have lost by death one member each, and *all* have had an unusual amount of sickness. I have a patient there now. Indeed that well is indebted to me for more unpaid accounts than any other well in the country. The character of the diseases has been principally *bilious*. A babe died with something like a cerebro-spinal difficulty, but the diagnosis was obscure. The other case was a boy 15 years old, who sprained his knee; phlegmonous inflammation supervened, gangrene set in, and the whole course of the difficulty indicated a poisoned condition of the blood.

But what I wish *particularly* to notice is, that while we have had during the past 15 years, in every part of the village, diphtheria and scarlet fever in abundance, we have not had a *single case of either in this house*.

Is it not a noticeable fact that in a large majority of cases a simple pharyngitis from cold becomes the *nidus* of the diphtheritic germ-poison, whether it be ingrafted upon the sensitive membrane from without, or thrown out as a specific exudation from within? Such at least is my observation.

Very respectfully yours,

Mendon, Mich., Feb. 19, 1877.

H. C. CLAPP.

REPLIES BY W. H. YOUNG, M. D., OF NASHVILLE, MICH.

Secretary of State Board of Health:

DOCTOR:—In regard to the origin and spread of diphtheria in this section, I can best answer your questions by giving you an account of a few of the first cases that appeared in this vicinity.

The first case occurred in the family of a Mr. Hynd; but as they were unable to speak English, I was unable to ascertain any facts bearing upon its origin. This family, consisting of seven persons, lived in a small log house, consisting of one apartment only, in which they both lived and slept. The house was located a few rods distant from a swamp, and the water-supply was derived from a shallow well, which, no doubt, received its supply by drainage from this swamp. In this family four persons were attacked, resulting in one death, which occurred previously to their calling upon medical aid. During the sickness of Mr. H.'s family, Mr. S., living two miles distant, frequently visited Mr. H.'s, and assisted some in caring for the sick. About three weeks after this, diphtheria appeared in Mr. S.'s family. His family consisted of eight persons. The house was located on high ground, remote from any swamps, and the water used by the family was drawn from a deep well. All of Mr. S.'s family, excepting himself and youngest child, aged fifteen months, were attacked, resulting in two deaths. During the sickness of Mr. S.'s family, his sister, Mrs. K., who resided five miles distant, came to assist in caring for her sister and family. Mrs. K., having a small child, about one year old, brought her eldest girl, about 15 years of age, with her to take care of the child, but took the precaution to leave this girl and child at Mr. D.'s, a few rods distant from S.'s. During their stay there, there was frequent intercourse between these two families, and in about four days this girl was taken with diphtheria; but no other case occurred in Mr. D.'s family. As soon as this girl had sufficiently recovered, Mrs. K. and children returned home, and in three weeks afterwards two more of her children were taken with the disease, although they had not been to Mr. S.'s, or, in fact, away from home. After Mrs. K. returned home, Mrs. P., living two miles distant from S.'s, came and remained a few days. Three weeks after her return home, her own children were taken with the disease, although she had taken the precaution to change all of her clothing as soon as she arrived home. From this time the disease became more general throughout this section, but still many of the cases presented much probability that their origin was direct infection from some other case.

These cases which I have given you in detail occurred under very different sanitary conditions and surroundings, so that I can attribute the spread of the disease to no other cause than that of direct infection. The severity of the disease appeared to be influenced very materially by the sanitary condition in which the patients were placed, the severer cases occurring in families where a number were crowded into one small room.

I do not decide any case to be diphtheria unless I find diphtheritic membrane; but there are many cases of the catarrhal variety in which the diphtheritic deposit is so slight that it might easily be overlooked. Sometimes it appears only as a number of small spots, resting on a highly inflamed, uniformly red surface, these spots exfoliating, in due course of time, without showing any marked tendency to spread. At other times, these spots gradually extend until they coalesce, forming one large deposit. During the past year, however, I have noticed a marked tendency to throat affections, many cases presenting no more marked symptoms than a hyperæmia of the parts. I do not look upon such cases as diphtheria, but I have thought that they might have the same relation to it as diarrhœa has to cholera, in seasons when the latter disease is prevalent.

From the questions you propose, I judge that you think it probable that the water used may be the source whence the disease is derived; but so far my experience does not show such to be the case. Each family into which the disease entered appeared to furnish a new source of infection, through which others became infected. There was one circumstance connected with this disease which appears a little peculiar, and that was the almost complete immunity from the disease in young children. In several families attacked by the disease, where there were young children, these escaped while others were attacked.

In regard to preventing the spread of this disease, I think that no system of sanitary regulations will be of any avail unless a strict quarantine is placed upon every household in which it appears. The poison of diphtheria, whatever that may be, appears to be capable of withstanding the influence of ordinary disinfectants, such as chloride of lime, carbolic acid, etc.; for, in more than one instance, I have found new

cases to occur in the same house, after it had been thoroughly* disinfected, on the introduction into the family of other members, who had not previously been exposed to infection.

You ask in regard to the emanations from drying of ponds, etc., in this vicinity. I do not think that this has any influence upon this class of diseases.

Yours respectfully,

Nashville, Mich., Feb. 23, 1877.

W. H. YOUNG.

REPLIES BY A. I. SAWYER, M. D., OF MONROE, MICH.

DEAR DOCTOR:—In reply to your communication and interrogatories of Feb. 8, I would say that the first severe case of diphtheria that I had under treatment was that of a little girl about 8 years old. The family are poor and live in a small one-story frame building, with but two rooms, and have several children. The house has no cellar and the floor appears to rest upon, or is very close to, the ground. The house also appears to stand in a low spot as compared with that immediately around it, so that whenever there is a thaw, water stands on two sides of the house in considerable quantities.

Again, the house is directly adjoining a millyard (steam, however,) but there is at all times a great deal of decaying sawdust or wood. The water was the same as that used to supply steam for the mill, but of course must be more or less impregnated with decaying vegetable matter and other substances incident to the long-continued presence of quite a number of laboring men and boys.

The family are of the Montreal French "breed," and many think there is no class who approximate more nearly to the aborigines than they do, and this family would not be very likely to be counted out under such circumstances.

I do not know that I can do any better in this case, under the circumstances and pressed as I am for time.

Yours sincerely,

Monroe, Mich., Feb. 23, 1877.

A. I. SAWYER.

REPLIES BY N. I. PACKARD, M. D., OF STURGIS, MICH.

DEAR DOCTOR:—As requested in yours of Jan. 25, I have thoroughly investigated the cases of diphtheria.

My first case occurred in a family of more than ordinary intelligence in regard to sanitary matters. The house is large, airy, well lighted, and ventilated; it has a stone-walled cellar, dry and sweet; the privy is 100 feet from the well; the soil is sandy loam; the water is excellent; in fact the surroundings, as far as I can discover, are unexceptionable. A few cases, I am informed, had previously occurred in the same vicinity, beyond the limits of my ride.

On my first visit the patient was separated from the rest of the family, and the care and sanitary conditions being excellent, no other case occurred.

I would be glad to do anything in my power to throw light on the important questions before you, but this is *emphatically* a very healthy locality, and material for sanitary investigation is scarce.

Very respectfully,

Sturgis, Mich., Feb. 24, 1877.

NELSON I. PACKARD.

REPLIES BY A. HAZLEWOOD, M. D., OF GRAND RAPIDS, MICH.

Secretary State Board of Health:

DEAR DOCTOR:—Yours concerning diphtheria came last week. I have waited, hoping to discover some light. Without repeating questions, I will answer them so that you can refer to them:

I do not decide any case to be diphtheria, unless characteristic membrane is present.

I can not trace the disease.

I have no evidence concerning aggravation.

I have seen no severe cases.

I have examined two specimens of water, but with no positive results.

* [Thorough disinfection could not be accomplished by chloride of lime or carbolic acid; but only through use of dense vapors of chlorine or sulphurous acid gas. If the disease was conveyed after such disinfection, it would seem reasonable to conclude that it was conveyed by direct contagion from the body of a person suffering from the disease.—H. B. B., *Sec'y.*]

Most of my patients that have been troubled with diphtheria sleep upstairs. Their personal habits were good.

Our city has suffered from drought for some time. There have been no good showers since early in November last; we have had some snow since. A portion of our city population depend upon cistern-water; still I have no evidence to show that the use of it bears any relation to diphtheria, as most of the cases I have seen were in families using well-water; but the *notion* has entered my mind that diphtheria commenced with the snow, and that if not now immediately dependent upon it, it has been kept up by contagion. The cases I have seen lately have been of a very mild type, in some instances not interfering with the daily duties of the affected, further than a feeling of malaise occasions.

Ventilation seems to me the best preventive, and the lack of it as fruitful a source as any of its spread.

Yours respectfully,

Grand Rapids, Mich., Feb. 26, 1877.

A. HAZLEWOOD,

REPLIES BY GEORGE L. CORNELL, M. D., OF ST. CLAIR, MICH.

DEAR SIR:—In reply to your questions in yours of the 12th inst., I would say that I could not trace the origin of the few cases of diphtheria that have occurred here during the winter, to any source of contagion. So far as I know, there have been but two cases in any one family. In that family, one child died (the first taken, and, I think, not properly treated), one recovered, and the third escaped without attack. Occupied the first floor; no cellar; floor near the ground; family cleanly, but rooms small and not well ventilated. Used water from a well not more than twenty feet from the privy. Soil, clay.

In the other cases, the water used was from the St. Clair River and from wells; about equally divided. I think they generally occupied first floor. I do not know of any case where there was a cellar under the house; in fact, but very few houses here have them. I have made no microscopical examination of the water in the wells, but the water in St. Clair River is as pure as holy water. I have learned of no cases during the last two or three weeks.

Very respectfully,

GEORGE L. CORNELL,

St. Clair, Mich., Feb. 28, 1877,

Health Officer.

REPLIES BY M. NORTHUP, M. D., OF PORT HURON, MICH.

Secretary of State Board of Health:

DEAR SIR:—Your letter of the 8th inst., relative to diphtheria, has been received and considered. We have had sporadic cases here for the last three years. When several cases have occurred in a family, I have not been able to satisfy myself how the first one contracted the disease. The recent cases have been very light. Our water-supply is from Lake Huron, and not liable to contamination from local causes. There are a good many families living in the suburbs who get their water from wells, but no cases there have come under my observation. Now that my attention is fixed upon the subject, I will observe the conditions more closely, and report to you at another time.

Yours respectfully,

Port Huron, Mich., Feb. 12, 1877.

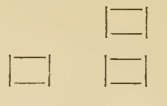
M. NORTHUP, M. D.

REPLIES BY I. E. RANDALL, M. D., OF WENONA, MICH.

Secretary State Board of Health:

DEAR DOCTOR:—Yours of the 15th ult., making inquiries relative to cases of diphtheria, was received in due time. I have examined the premises in several localities where I have had cases of the disease, but have not had time to make the examination as thorough as I could wish. I do not decide a case to be diphtheria unless the plastic exudation or membrane is present. I cannot trace the first case to any particular source of origin. The disease first made its appearance about August 1, in the village north of Wenona, called Banks, which is situated on a low piece of ground (some parts being sand and black muck and others a clay and loam). Probably 20 cases occurred in Banks (two or three only of them being severe), to which place it was confined until November or December, when it made its appearance in that part of Wenona which is located on a clay soil. No case occurred here until cold weather set in. I have been able to trace cases from one house to another, but

cannot clearly satisfy myself that it originated from water contaminated by privy-vaults, sewers, etc. Three families resided in separate dwellings, situated not over 150 feet from each other, on the corner of a block, thus:



Diphtheria broke out in one of the families in a very mild form, there being only a slight plastic exudation in the throat on the tonsils, which soon disappeared and soon reappeared in the nose in the form of a thick tough membrane. This did not disappear for several days, though the patient's general health was but little affected (girl aged 6 years), being able to walk about the house all of the time, also eating and sleeping well. After about 10 days, it appeared in one of the adjacent houses, in the person of a young lady teacher, employed in our public school. This case was very mild. About 3 weeks after, it appeared in the third house, attacking two children, aged 12 and 7 years, in the most malignant form. Both died, one living 3 weeks the other two weeks. I attended them during the last week they lived, both dying the same day. These families had all communicated freely with each other while affected. The water used by two of the families, who were least affected, was obtained from a well made of 30-inch tile, with a charcoal filter in the bottom. The third family (bad cases occurred) obtained water from a well dug in clay which was so hard that no curb was required. The privy was about 50 feet distant, on ground 5 or 6 feet lower, and which continued to descend from the well. All of the wells are low about here, as a rule, and have been for the last 8 months. Is it not possible that the long-continued dry weather may have something to do with it; that there is a climatic influence at work; that perhaps the blood of persons residing in certain districts is in a condition which only renders it necessary to meet with an exciting cause to develop the disease? I have found that in nearly every case with which I have met the individual had been exposed to cold or damp weather, and had, as they expressed it, "taken cold." I have ordered every member of the families where a case has occurred to take Tinct. Fer. Chlo. 3 times a day, and I know of no instances of those not affected contracting it where they have followed it up faithfully.

Respectfully,

Wenona, Mich., March 10, 1877.

I. E. RANDALL.

REPLIES BY G. W. TOPPING, M. D., OF DE WITT, MICH.

Secretary State Board of Health:

DEAR DOCTOR:—Your letter of inquiry of the 16th inst. has been received and considered. I do not call any disease diphtheria in which a diphtheritic membrane is not found upon some portion of the pharynx or buccal mucous membrane during some part of the disease. I do not now recollect treating more than two cases of diphtheria during the past year, though pharyngitis and tonsillitis are now about the most common diseases which I have to treat. The first of these diphtheritic cases occurred last July, in an old, broken-down woman, and presented more extensive and thick diphtheritic membranes than I have ever seen in any other case; these membranes were quickly reproduced after removal. The well was very near the kitchen door, say within ten feet, and the water looked roily and impure, and had a brackish taste. There was quite an extensive marsh, which came within 15 rods of the house, and the kitchen floor seemed damp from being too near the earth. There was no cellar. The soil is sandy and gravelly. Family consisted of the patient and husband. Patient died.

The other and last case occurred the latter part of March, 1877. The patient was a woman about 30. It was not a very severe case. Had a well-defined membrane upon either tonsil. Lived at the time in an old, rotten log-house, with a wet board shanty on the back. Floor of board shanty seemed very wet all the time. Water from the side of the hill above the house ran under the floor. No cellar. House logs very rotten. No well; got water from a spring in a low piece of ground six rods from the house. I never examined the water except by sight; it was not clear. Barn 40 feet from the house. This woman had lived at this place but a short time, perhaps two or three weeks. She recovered with partial paralysis of pharyngeal muscles, which lasted for about two weeks more.

I have never seen any evidence of contagion in my cases, but they have seemed to me to depend upon unsanitary conditions. In this last case the privy was about

two rods from the house, and in the former one, about three rods. Several of my cases of pharyngitis lately have presented considerable exudation upon the fauces, of a white pasty consistence, easily removed with a brush or probang. Sometimes it has assumed the appearance of a very thin, delicate, white film, removable with a probang, and thereby exposing a deep, sometimes dusky, red, thickened mucous membrane. In many of these cases there is, for a portion of the time, some fever of a subacute character.

De Witt, Mich., April 19, 1877.

G. W. TOPPING.

REPLIES BY W. H. BURR, M. D., OF BAY CITY, MICH.

DEAR SIR:—In reply to yours of the 16th inst., relative to diphtheria, I would say that the case reported did not come under my own observation, but was reported to me by another physician. I was not able to investigate the case as to cause, etc., and therefore cannot answer your questions. This may have been a case of the disease quite prevalent here in the spring, and called by some diphtheria, but which is not true diphtheria. That is very rare here. I have seen but one case, and that occurred in a locality where the water-supply was bad and drainage defective. I will preserve your list of questions, and in case I hear of another case will investigate it, if possible, and write you.

Yours, etc.,

W. H. BURR.

Bay City, Mich., April 20, 1877.

REPLIES BY H. R. MILLS, M. D., OF PORT HURON, MICH.

Secretary of State Board of Health:

DOCTOR:—I have the honor to acknowledge receipt of your communication of the 16th inst., and render the desired answers in the order in which the questions occurred.*

1. I do not.
2. I cannot; I have seen only the case in question during the Winter.
- 3, 4. I think I have. The house is over a cellar in which there is a vigorous growth of mould. The soil is sandy and porous, and the water drains away rapidly. This cellar, however, is poorly ventilated and badly lighted.
5. The water used by this family is from the city water-works. The supply is nearly direct from the bed of Lake Huron.
9. The family lives on the ground floor in a cottage house, in a high and dry part of the city, with plenty of yard room.
10. The number sleeping on the first floor must be 5 or 6.
11. Yes.
12. No well in the vicinity and no well-water used.
13. Diphtheria has not prevailed here to any extent for several years.

Very respectfully,

Port Huron, Mich., Apr. 25, 1877.

H. R. MILLS, M. D.

REPLIES BY W. F. BREakey, M. D., OF ANN ARBOR, MICH.

Secretary State Board of Health:

DEAR DOCTOR:—In reply to your inquiries of April 25, concerning diphtheria reported in previous week, I would say that I do *not* decide any case to be diphtheria except I find the diphtheritic membrane.

I had but one case, and that very mild, though with the characteristic membranous exudation. The patient enjoyed better than the average sanitary and hygienic conditions at home, and I have been unable to trace it to any contagious origin. I hear that one or two other cases had been so called by other physicians. I have not been able to verify the report, but know that the cases were mild.

Very truly yours,

Ann Arbor, Mich., Apr. 30, 1878.

W. F. BREakey.

REPLIES BY SAMUEL KITCHEN, M. D., OF EAST SAGINAW, MICH.

DOCTOR:—Yours of the 4th inst. came sometime ago, and I intended to write you ere this, but business has been in the way continually; but I think I will fetch it this time.

I *do not* decide a case to be diphtheria unless I find the membrane.

The cases of diphtheria that have come under my care were last Spring and in De-

[* See letter, substantially the same, on page 353 of this report.]

ember last. Those last Spring were in the family of Mr. G. P. B., a market-gardener. The first child was taken sick February 27, and died March 6, aged 5 years; the next, the afternoon of February 27, and died March 2, aged 21 months; three other cases in the same family recovered.

The cases in December last, were in the family of Mr. M. B., a builder. There were two cases in this family, one a child 3 years old, and the other of less than one year; both recovered; the 3-year-old child was a severe case; they were both taken on December 25, 1877.

B., the gardener, collects manure through the city wherever he can get it, mostly stable manure, and piles it up until he uses it, either in hotbeds or on his garden; he also keeps a horse and cows in a stable near his house. His lot is four acres, nearly square, and he lives on one corner of it. B., the builder, lives beside another market-garden in another part of the city, and the same handling of the manure obtains as in the case of B., the gardener. He also keeps a cow, chicken-house, and other places. I am not sure but he has a pig-pen on the same lot. The wells of both places are shallow and the ground flat; soil perhaps a foot deep, below which is a stiff clay, which is completely honey-combed by crawfish, and no doubt some of the drainage from the manure finds its way into the water of the wells.

Hoping that this will be satisfactory as far as it goes,

I am, very respectfully, your obt' servant.

East Saginaw, Mich., Jan. 22, 1878.

SAMUEL KITCHEN.

SPECIAL REPORT OF HEALTH OFFICER OF ADA TOWNSHIP, KENT CO., MICH.

To Secretary State Board of Health:

SIR:—In addition to my annual report to your office, I submit the following statement concerning the late epidemic through which we have passed.

The first case of diphtheria appeared to be endemic, as by my annual report you will see it occurred some four weeks before the epidemic form appeared. I had been watching closely during the Summer and Fall for its advent; for in Grand Rapids city, ten miles from us, it had been raging since June with fearful mortality, and still continues, though not so prevalent or fatal.

I cannot trace the first case to any known cause.

I have no evidence of want of sanitary conditions, as compared with those of the last fifteen years.

Water-supply the same as formerly. Privies are situated from forty to one hundred feet from wells and on lower ground (except in one case).

The soil in some localities is sand or gravel, and dry; in one case only is it different, and that is prairie soil; these localities are where the fatal cases occurred.

The cellars are dry, except in three localities, and in these there appeared no more malignancy than in the dry ones.

Walls and floors appeared as usual, no damp or mold.

I consider *perfect ventilation* for the diseased, and immediate removal of the well ones from infection to be the best course to pursue to save life and check spreading of the contagion.

During a medical practice of over fifteen years in this place, I have had diphtheria more or less twelve seasons, from one or two cases to some ten or fifteen, and have made it a special study during this time. Consider its inception due to atmospheric and miasmatic causes, and that in addition it is propagated by contagion imbibed mostly by inhaling putrid effluvia from the sick.

In the malignant form of this epidemic under consideration, I found where ventilation was most perfect and unremitting care bestowed day and night, success was more sure to follow. Of the seven deaths I report, four were of highly sensitive, delicately and nervously organized persons. Two others were evidently overwhelmed by the contagion, and one, a young babe, was taken after the termination of three malignant cases in the same house.

I have reported only cases having characteristic exudation; many others were afflicted at the same time with severe inflammation of throat and tonsils, evidently of a diphtheritic character, lacking membrane or exudation. To my knowledge, derived from undoubted sources, there were several cases, treated by other physicians, called diphtheria where exudation was absent.

I hope this special report will meet with your expectation and give you in some degree data for future reference.

Yours respectfully,

Ada, Kent Co., Mich., February 2, 1878.

A. G. CHASE, M. D.,

Health Officer, Ada Township Board of Health.

REPORT BY WILLIAM HYSER, M. D., HEALTH OFFICER OF PLAINFIELD, MICH.

Secretary of the State Board of Health:

SIR:—I have the honor to transmit with my annual report an account of an epidemic of diphtheria that occurred in my practice (though not in my jurisdiction) during a portion of the month of January, just passed. I call it an epidemic, because the first three families that were attacked lived at a distance of several miles from each other, there had been no communication with each other, they were attacked almost simultaneously, and in a district of country where diphtheria had never been known. The first case that came under my notice was in Ada township, south of Grand River, two little girls, aged 8 and 10 years respectively. The report of the parents was, that they came home from school on Friday, January 4, with a cold and headache. I was called to see them January 9. The case of the oldest was hopeless, and she died the same day. In the younger the diphtheritic exudation was confined to the tonsils, anterior portion of the pharynx, and upwards along the posterior edge of the soft palate. There was no fever and but slight prostration. She made a rapid recovery.

January 12 I was called to see case No. 2 (see Diagram*), in the township of Cannon, about four miles north and east of No. 1, and north of Grand River. There could be no possible communication, as there is no crossing-place within three miles in either direction from a line drawn from one to the other. In this family there are seven children; six of whom were attacked,—one January 12, two the 20th, two the 22d, and one the 24th. Of these, two died, one on the second day, and the other on the sixth day after being attacked. The rest made a slow recovery.

On the 18th inst. I was called to a family two miles directly south of the preceding (No. 3, see Diagram*), in Ada township, about six miles east of my first cases, but on the opposite side of Grand River. There was no communication whatever with either of the two last-named families. This case made a rapid recovery. On the same day, Jan. 18, two more cases occurred one-half mile east of the line connecting Nos. 2 and 3, and about equi-distant from each. These cases both died. [See replies by Dr. Chamberlin, following these by Dr. Hyser.] I enclose a rough Diagram,* and number the cases in the order they occurred. Two more cases occurred on this north and south road that were mild, and made a rapid recovery.

Now, in each of these localities the soil is clayey, or retentive of water, but with sufficient slope to secure perfect natural drainage. The cases all occurred in good, well-nourished, and cleanly families, and an epidemic having its origin in filth, imperfect drainage or ventilation could not occur. During the greater part of the month of December there was no frost in this vicinity, scarcely a day that the sun was seen, and a large per cent of rainy and foggy days. I am too busy to keep a weather record, but think there were about 23 successive days without frost. Now, taking in consideration the fact that the most fatal cases in an adjoining township, Algoma, were on precisely the same soils, and in elevated situations, I must come to the conclusion, that the long-continued wet weather, in the absence of frost and *sunlight*, generated a peculiar poison in soils retentive of the rain-fall.

I remain respectfully, your obedient servant,

Belmont, Kent Co., Mich., Feb. 2, 1878.

WM. HYSER, M. D.

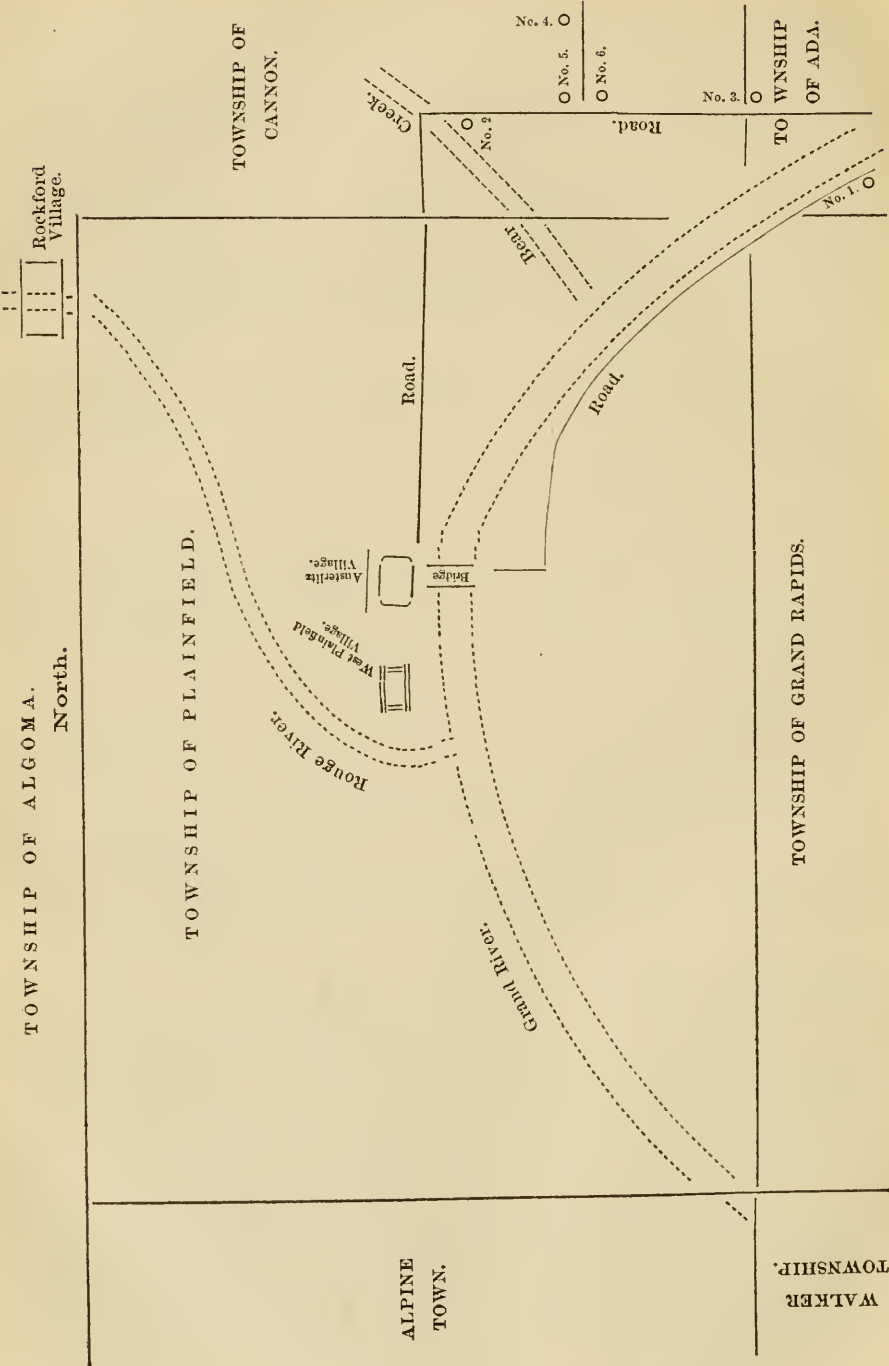
Dr. Hyser writes again under date of Feb. 18, 1878:

DEAR DOCTOR:—Yours of the 8th inst., with valuable suggestions, is before me. I have been investigating the matter since writing you, as fast as my present limited time would permit, and have reached some conclusions, but am not yet sufficiently "posted" in one or more of the cases to make an exhaustive report. I supposed the disease (diphtheria), had entirely ceased in this vicinity, when it suddenly made its appearance in a family that was, in every sense that I could ascertain, completely isolated. The nearest of the previous cases was in a right line at least a mile distant, by road three miles. The whole neighborhood had by common consent remained at home until all danger should be past, and nothing for several months had gone into the house from abroad except groceries purchased at a store that was entirely outside of any point of infection, and even the store had not purchased wrapping-paper or twine for six months past. The family entered into the spirit of the investigation and could remember of no circumstance by which diphtheria could be introduced by contagion; and singularly enough a five-year-old boy that had not been out of the yard for three months was the first attacked, and died the 7th day, the 15th inst.; and now, the 18th, other members of the family are being successively taken. As soon as I can gather all the facts within my reach, I shall make a more exhaustive report.

Very respectfully yours,

WM. HYSER, M. D.

[* The diagram is given on the page following this.]



REPLIES BY C. L. CHAMBERLIN, M. D., OF CANNONSBURG, MICH.

Secretary State Board of Health:

DEAR SIR:—In reply to yours of February 6, I can confidently assert that the water used by families having diphtheria has not been in any way the cause of the disease, being taken as it was from living, running springs. Now I give the name diphtheria only to cases which have the diphtheritic deposit; yet I claim there are true cases of that disease where there is no deposit of false membrane. In the west part of the town three or four children were sick of sore throat (perhaps diphtheria).* I did not see the cases, but they were visited by a lady with her two little boys, aged 3 and 5 years. This was on Sunday, and on Tuesday the eldest boy was taken with diphtheria and died the next Monday. The youngest boy was taken the Saturday following the visit and died a week from the next Tuesday.† These people live on very high gravelly soil, get water from a living spring, have a good, warm, dry house and cellar, sleep on first floor, and are very cleanly. Two or three at least who visited the family have had diphtheria, but in a milder form, and recovered.

This week I have had two cases in the extreme east part of the town, but am unable to trace these cases to contact with other cases. The soil where they live is heavy clay, but the land is quite rolling. They get water from wells 16 and 20 feet deep, and well stoned. Live in good warm houses; one no cellar, the other good dry cellar. Both families very cleanly in their habits. One well four rods from house, the other perhaps two rods, but both well protected from filth. The first cases get water from natural springs; springs 10 or 15 rods from house or barn. Privy, nearest well at least 6 rods. The disease is abating in this locality, and seems to abate rapidly whenever there are a few days of cold dry weather, and return with warm damp weather. Perhaps one-half of the people in this vicinity have had more or less sore throat, some amounting to diphtheria, others to severe cases of tonsillitis, but generally nothing severe or alarming.

Faithfully yours,

Cannonsburg, Kent Co., Mich., Feb. 9, 1878.

C. L. CHAMBERLIN, M. D.

REPORTS OF PREVALENCE OF DIPHTHERIA.

Dr. E. Hause, of Tecumseh, reported somewhat in detail three cases of "putrid sore throat" in one family in August, 1876.

Peter Boudour, Clerk of Au Gres township, Bay Co., reported in detail 2 cases of diphtheria in April, 1877.

E. R. Redfield, Supervisor and Health Officer of Oakland township, Oakland Co., reported details of 18 cases of diphtheria and 9 deaths, from May 2 to Aug. 28, 1877.

Benj. F. Baker, Health Officer of Pulaski township, Jackson Co., reported details of 8 cases of diphtheria, 2 of which were fatal, in Sept., 1877.

O. C. Lyon, Health Officer and President of village of Tekonsha, Mich., Nov. 9, 1877, reported that an epidemic of diphtheria prevailed there in which one-third of the cases were fatal, and asked for investigation by the State Board of Health.

A. E. Colerick, M. D., Health Officer of Tekonsha township, Calhoun Co., reported 8 cases of diphtheria, 2 of which were fatal, occurring in the Fall of 1877.

REPORT OF A SPECIAL INVESTIGATION OF AN OUTBREAK OF DIPHTHERIA AT ROCHESTER, OAKLAND CO., MICH.,—INVESTIGATED AT THE REQUEST OF THE STATE BOARD OF HEALTH, BY J. S. CAULKINS, M. D., OF THORNVILLE, MICH.

Secretary of the State Board of Health:

DEAR SIR:—In compliance with the request of your Board, as expressed at their meeting in July, 1877, I have made an investigation of the epidemic of diphtheria

[* Perhaps the cases mentioned by Dr. Hyser, and located in the diagram on opposite page.—H. B. B., Sec'y.]

[† These may be the same cases mentioned by Dr. Hyser, and which he did not succeed in tracing. If they contracted the disease during their Sunday visit, the period of incubation was two days in one case and six days in the other.—H. B. B., Sec'y.]

which prevailed at and near Rochester last Summer, and have the honor to transmit my report.

It seemed to me that the two cardinal points toward which inquiry should turn are these: (1.) Is diphtheria a contagious disease? (2.) If so, do bad sanitary conditions conduce to increase its malignancy? There is a third query, of secondary, but of great importance, with regard to which information is desirable; viz., Is the disease a local one in its origin? and is the constitutional infection secondary? Of course, if the first query is answered negatively, the second would resolve itself into this: What are the bad sanitary conditions that cause the disease? If the first query is answered affirmatively, the importance of the affirmation of the third becomes greater; because we would then have the time of the incubatory stage, in which to kill or dislodge the germ of the disease from its *nidus* in the throat.

In collecting information bearing on the above points, I used the questions in the following schedules, not relying too much on statements received, but, wherever possible, verifying them by my own observation:

CONCERNING THE LOCALITY.

1. Was the locality in a village, or in the country?
2. What was the nature of soil,—clay or sand?
3. Was the locality wet or dry? high or low? bleak or sheltered?

CONCERNING THE HOUSE.

1. Is the house new or old?
2. What is its distance from other houses?
3. What is the exposure of the house?
4. How is the living-room lighted?
5. What is the exposure of the living-room?
6. How long has the family lived in the house?
7. Is any previous history of diphtheria connected with it?
8. Is the cellar under the living-room?
9. Does it open into it?
10. What was the condition of the cellar,—clean or dirty? wet, damp, or dry?
11. Have vegetables been allowed to go to decay in it?
12. How often is it cleaned?
13. What disinfectants have been used, and to what extent?
14. What fuel is used, and where is it kept?
15. How near is the wood-house or wood-yard to the living-room?
16. How often is it cleaned?
17. Does it contain several years' collection of old rotten chips?

CONCERNING THE WATER-SUPPLY.

1. What was the source of the drinking-water,—well, spring, or cistern?
2. What was the character of the drinking-water, good or bad in taste or smell? clear or roily?
3. What was the depth of well and of the water in it?
4. How was the water drawn, with pump or bucket?
5. Was there a tub in the bottom of the well?
6. Was the platform sound or rotten?
7. Was the well properly secured around the top from surface drainage?
8. What was the source of the wash-water?

CONCERNING THE PRIVY.

1. How was the privy constructed?
2. How cared for,—cleaned or moved?
3. How many times moved?
4. How near is it to the well?

CONCERNING THE SICK,—FIRST CASE.

1. What was the name and age of the person sick?
2. What was the date of attack?
3. Was this the first attack of diphtheria?
4. If not, how long since the first?
5. What was the first symptom?
6. What were the principal symptoms?
7. What was the duration of the disease?
8. What was the termination?

CONCERNING CONTAGION.

1. Is there reason to suspect that the disease had a contagious source?
2. If so, what was its origin?
3. Is there reason to believe that the disease was communicated to others by the sick?
4. How many of the family escaped from any attack of the disease?

CONCERNING ADDITIONAL CASES.

1. How many were the additional cases?
2. How many were fatal? Names and ages?

FIRST SERIES OF CASES.

(Family of — Patterson, a Clerk.)

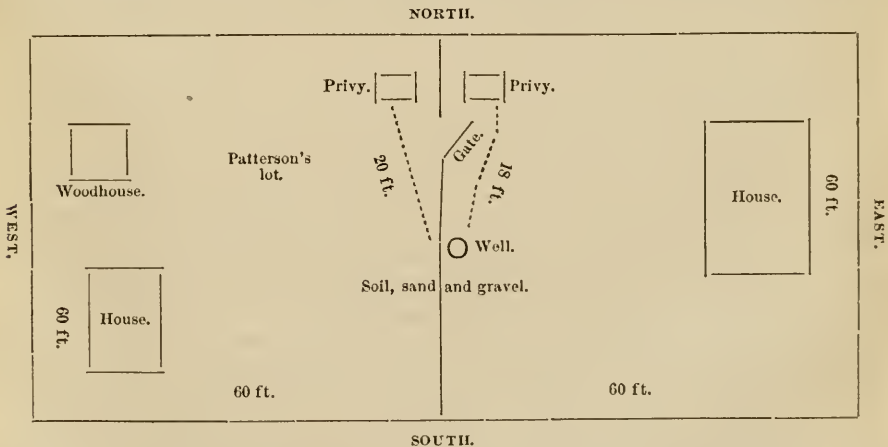
Locality.—Western edge of the village of Rochester; soil, sand and gravel; situation, low but dry,—sheltered.

House.—New; 3 rods from other houses; exposure, ground level; living-room, lighted by two 8-lighted windows,—exposure, western; family had lived in it two years; no previous history of diphtheria connected with the house; cellar, not under living-room, opens into pantry, clean and dry, but has no ventilation; no stone wall; plastered with water-lime against the earth on sides and bottom, has no windows; vegetables have not been allowed to decay in it; cleaned twice a year; no disinfectants are used. Fuel, wood; generally kept in a small detached woodhouse, sometimes outside of it; woodhouse, 15 feet from living-room; cleaned yearly; at time of sickness, contained no chips.

Water-supply.—Drinking-water, from well on a neighbor's premises; clear and good in taste, according to opinion of family,—bad, according to my own taste and that of the young gentleman who was with me; well, 33 feet deep, with 30 inches of water; water drawn with an iron pump; tub and curbing in well; platform, sound; not well secured; in heavy Spring freshets surface water must find its way into the well; the family, however, report that it is never roily; cistern-water used for washing.

Privy.—Over a pit not walled; never cleaned or moved since built; 20 feet from well; another privy within 18 feet of well.—See Diagram below.

Diagram of the premises of the Pattersons and adjacent lot, showing relative position of privies and well. (The lot is a single village lot, 120 feet by 60 feet, cut into halves.)



Persons sick.—(Case 1.) Cyrus Patterson, aged 2 years, 4 months; attacked April 9, 1877; first attack. First symptoms; chill, fever, and vomiting. Principal symptoms; malignant sore throat, resulting in perforation or sloughing through to the external surface. Duration of disease, 11 days; termination fatal.

Concerning contagion.—The family do not believe in the contagious nature of diphtheria, and say that the child was exposed to no danger of contracting it. Inasmuch as it was necessary to have an initial case somewhere, I made no particular effort to trace the infection in this case to its source; but according to information furnished

me by Dr. Wilson, the last case of diphtheria that had come under his notice was a not severe case, three miles from the village, March 20. The last case in the village was February 28, and it is quite probable that this was where the Patterson's got the disease; since the women were friends brought up near each other in the country.

These facts are mentioned to show that it would not have been difficult at the time to trace the source of infection in the case of the Patterson's; but time not permitting at this late day, I have assumed their house as the starting point of my investigation, because it was there that the first malignant and fatal case occurred.

(Cases 2 to 4.)—Mrs. Patterson, aged 27, the mother of the child, sickened with the disease on the 14th; the baby, aged 9 months, on the 20th; Mrs. Johnson, Mrs. Patterson's mother, who had come from her own home to care for the family, on the 19th. Mrs. Johnson's age was not learned; probably it was about 50. This was the oldest case that occurred, or at least that came to my knowledge. Mr. Patterson, who was about 28 years old, escaped.

SECOND SERIES OF CASES.

(Family of — Miller, a Farmer.)

Locality.—Country, 3 miles from Rochester; soil, clay; situation, quite dry, rather bleak.

House.—Old log house; 40 rods from other houses; exposure, slightly to south; living-room lighted by two windows, one looking south; opens to the south; family had lived in it 12 years; no previous history of diphtheria connected with it. No cellar, but a hole under the floor to put potatoes in, opening, by a trap-door, into the living-room. Such a place cannot, of course, be kept very clean; but the family say it is always dry. I went down into it with a light, and should say that it is, at present, in about as good condition as such a place can be kept. The boards overhead are quite dry and free from mould. The potatoes are covered with chaff to keep them from freezing. The family say that no vegetables have been allowed to decay in it, and make some complaint about false rumors to the contrary, among their neighbors. Every Spring the chaff which is used to cover the potatoes is removed. No disinfectants had been used previously to the breaking out of the disease; since that chloride of lime has been used once or twice. I advised the burning of sulphur for a disinfectant in the cellar. Fuel, wood, kept in a pile about two rods from the house; yard had been cleaned about 18 months previously to sickness.

Water-Supply.—Drinking-water, from a well, excellent; well 31 feet deep, with 5 feet of water; no tub or curbing, the well being dug in solid clay; platform, quite sound; well secured from surface-water. Rain-water caught in a barrel, used for washing.

Privy.—Over a pit in the ground; cleaned out one year previously to sickness; never moved; 6 rods from well.

Persons Sick.—(Case 5.) Sarah Rebecca Miller, aged 19 years; attacked April 20, 1877; first attack. First symptoms, chill and fever. Principal symptom, the throat trouble. Disease ran 7 or 8 days; terminated favorably.

Concerning Contagion.—The family say that there is no reason to suspect that the disease was derived by contagion. They believe that it originated in a cold. Inquiry into the history of the case shows that the girl probably caught it at Johnson's, mentioned in the preceding case. She went there to work while Mrs. Johnson was at Patterson's. Johnson was back and forward every day, and Mrs. Johnson was at home once, at least, while the girl was there. The presumption is that Johnson or his wife was the carrier of the disease germ. The disease was communicated to the rest of the family. The father and mother escaped.

Additional Cases.—(Cases 6 to 16.) There were 11 additional cases. Four of them were fatal. Josephine and Emma, aged 9 and 7, were taken sick 15 days after their sister came home; both died,—the first in 4, the second in 6 days. About 3 weeks after the funerals of the two children, Claudia, aged 5, died, as it is said, with a second attack; and later, Alice, aged 3, sickened and died in two days. Exact statements could not be obtained concerning the symptoms of the children, nor the dates of the attack,—which is not strange, considering the amount of sickness in the family.

THIRD SERIES OF CASES.

(Family of — Hawken, a Farmer.)

Locality.—Country, 3 miles from Rochester; soil, sand; situation, dry, rather low, sheltered.

House.—Living-room, new; 100 rods from other houses; exposure, ground declines

to the east; living-room, lighted by two windows,—exposure, east and west; family had lived in it three years; no previous history of diphtheria connected with the house. Cellar, under living-room and opens into it; dry, sides cemented; bottom, sand; no water gets into it; no vegetables allowed to decay in it; cleaned every Spring; no disinfectants used. Fuel, wood, kept in a pile near the house; wood-yard in the road, 2 rods off; not thoroughly cleaned; contains some old chips.

Water-supply.—Drinking-water, from a spring; good and clear; spring fixed with 3 railroad culvert-crocks sunk about 8 feet; water drawn with pail and hook; no tub in bottom; no platform; well secured at top. Cistern water used for washing.

Privy.—A pit in the ground; not cleaned out; never moved; just the width of the railroad from the well, the privy being on the uphill side.

Persons sick.—(Case 17.) Anna Hawken, aged 13; attacked May 8, 1877; first attack. First symptom, fever followed by throat symptoms. Disease ran two weeks and terminated favorably.

Concerning contagion.—The mother says that there is no reason to suspect that the disease was derived by contagion. Inquiry disclosed the fact that Anna went to Miller's both before and after the first child died there, which makes it probable that her attack was a little later than the 8th, as that must have been about the date of the first death in the Miller family. The disease was communicated to her brother David, about 3 weeks later. The father and mother escaped.

Additional cases.—(Case 18.) There was one additional case. These two cases were severe, but not fatal.

It was at this house that I met the only individual who was disposed to acknowledge that there was anything contagious about the disease; and she, when the woman of the house asserted her disbelief that any one ever caught diphtheria, only mildly contended that it was contagious among children.

FOURTH SERIES OF CASES.

(Family of W. H. Tillman, a Farmer.)

Locality.—Country, 3 miles from Rochester; soil, sand and clay; situation, generally dry, high hill to the west.

House.—Part very old, 25 years; 100 rods to other houses; exposure, east; living-room, well lighted,—exposure, north; the rest, 12 years old; family had lived in it 4 months; no known history of diphtheria connected with it. Cellar, not under living-room, opens into the pantry; dry; has a stone wall; bottom not cemented; not well cleaned; there were decayed apples and cabbages in it when the sickness occurred; apparently not cleaned at all; no disinfectant used. Fuel, wood, kept in woodhouse and yard outside; woodhouse pretty well cleaned, does not open into living-room; did not contain several years' collection of old rotten chips.

Water-Supply.—Drinking-water was taken at a neighbor's (Bates'), where Ada was living, where they used spring-water; well-water was used at home; not good in taste or smell, but clear; well, 30 feet deep; depth of water not known, but very little; water drawn with a bucket; tub and curbing in well; platform, rotten; not well secured. Rain-water caught in a barrel, used for washing.

Privy.—Over a pit in the ground; informant thinks it has stood a long time; it has been moved once, at least; 3 rods from well.

Persons Sick.—(Case 19.) Ada Ellen Tillman, aged 12 years; attacked May 14, 1877; first attack. First symptom, sore throat, followed by stupor. Principal symptom, gradual sinking. Disease ran 4 days and terminated fatally.

Concerning Contagion.—The mother thinks that there is no reason to suspect that the disease was derived by contagion. Inquiry shows that Mrs. Bates went several times to Miller's (about $\frac{3}{4}$ of a mile), and Tillman sat up at Miller's all night with the first child that died,—a week before Ada took sick. Either one might have been the carrier of the disease, as the girl was at home a good deal. The disease was communicated to her three brothers. The father and mother, aged about 25 or a little more, escaped.

Additional Cases.—(Cases 20 to 22.) There were three additional cases. One was fatal,—Jemmy, aged 4 years, lived 5 days; symptoms different from the girls'; throat apparently not bad; probably died of the blood-poisoning. The other two cases, aged ten and two, lived through it.

FIFTH SERIES OF CASES.

(Family of Herrick Bromley, a Farmer.)

The first case in this family was that of Rosa Snyder, a sister of Mrs. Bromley. She was not at home, and her history was not obtained. The family supposed that I

wanted only the history of the fatal cases, and gave the following answers before I learned that it was not the first case that they were describing.

Locality.—Country, four miles from Rochester; soil, sandy; situation, dry upland, bleak.

House.—Twenty-five years old; 12 rods from other houses; exposure of house, ground declines to west; living-room well lighted,—opens to west; family had lived in it three and one-half years; there is a tradition of diphtheria in the house several years ago. Cellar, under upright, not under living-room; opens into pantry; very dry; pointed stone wall, cemented bottom; kept very clean; no vegetables allowed to decay in it; swept every day and mopped once a week, at least, being used for a milkroom; well ventilated with four windows and outside door; no disinfectants used. Fuel, wood, kept in a pile outdoor; woodyard, 2 rods from house, cleaned every Spring, contains no rotten chips.

Water-supply.—Drinking-water, from a well; good and clear; well, ninety-three feet deep, with 3 or 4 feet of water; water drawn with bucket; tub and curbing in well; platform new and sound; well secured, 10 feet laid in water-lime. Cistern-water used for washing.

Privy.—Over a pit in the ground; moved 3 times in 7 years; 6 rods from well.

Persons Sick.—(Case 23.) Beulah B. Bromley, aged 9 years; attacked June 4, 1877; first attack, no previous sickness. First symptoms, fever and sore throat. Most remarkable symptom, the complete absence of pain. Disease ran 3 days; terminated fatally. Death seems to have been caused by blood-poisoning.

Concerning Contagion.—The father and mother say that there is no reason to suspect that the disease was derived by contagion. Inquiry shows that the father had sat up with nearly all the fatal cases, and that the aunt, Rosa Snyder, had been going among the sick and taking care of them at Miller's and other places, and that she had herself had the disease in a mild form, nine days before. Disease was communicated to the subsequent cases in the same family. I believe none entirely escaped.

Additional Cases.—(Cases 24 to 27.) There were 4 additional cases. None of them was fatal; the mother's case was rather severe.

SIXTH SERIES OF CASES.

(Family of William Ormsby, a Section-man.)

Locality.—Country, 3 miles north from Rochester; soil, sand; situation, dry, high, and sheltered.

House.—New; 6 rods from other houses; exposure, south and east; living-room well lighted, has north and south doors; family had lived in it 6 months; no previous history of diphtheria connected with it. Cellar, under living-room; stoned; hard clay bottom; opens outside, and not into living-room; dry, water never gets into it; no vegetables allowed to decay in it; kept clean, no disinfectants used. Fuel, wood; kept in pile near the house; wood-yard close to the house, kept clean, no rotten chips.

Water-supply.—Drinking-water, from well; good in taste, and clear; well 15 feet deep, with 3 feet of water; water drawn with bucket; tub in bottom, but no curb. Platform sound; well secured. Rain-water caught in a barrel, used for washing.

Privy.—Over a pit in the ground; had stood only 6 months; never moved; question as to distance from well, forgotten.

Persons Sick.—(Case 28.) Agnes Ormsby, aged 27; attacked June 7, 1877; first attack. First symptoms, sore throat and fever. Principal symptom, pain. Disease ran 5 days, terminated fatally. Death from blood-poisoning.

Concerning Contagion.—To believers in contagion, there is evidence of it in this case. The disease might have been brought into this family from any of the houses where it had previously appeared, as the woman had visited them all. It was communicated to her two children. Mr. Ormsby only escaped.

Additional Cases.—(Cases 29 and 30.) There were two additional cases. One was fatal. Ida May, aged 6 years, sickened June 13, lived 4 days; first symptom, vomiting.

SEVENTH SERIES OF CASES.

(Family of Saron Beardsley, a Farmer.)

Locality.—Country, 6 miles, N. W. of Rochester; soil, sandy loam; situation, dry, high, and bleak.

House.—Seven years built; half a mile to other houses; exposure, south; living-room, well lighted and ventilated,—exposure, east; family had lived in it 7 years; no previous history of diphtheria connected with it. Cellar not under living-room, opens into pantry; clean and dry; bottom cemented; well ventilated; no vegetables

have been allowed to decay in it; kept perfectly clean; no disinfectants used. Fuel, wood, kept in a pile; woodyard 40 feet from living-room; no rotten chips.

Water-Supply.—Drinking-water, from a well; good in taste, clear; well, 46 feet deep, with 4 or 5 feet of water; water drawn with a bucket; tub and curbing in well; platform sound; well secured. Cistern-water used for washing.

Privy.—Over a pit in the ground, not cleaned, not moved; pit very deep; 40 feet from well.

Persons Sick.—(Case 31.) John Beardsley, aged 8 years; attacked June 16, 1877; first attack. First symptom, headache. Principal symptoms, bad throat and stupor. Disease ran 14 days; boy recovered.

An interesting feature of this case is a rash that appeared on the fifth day of the disease, and lasted 3 days, followed by desquamation of the soles of the feet,—as if the disease meant to remind us of its relationship to scarlet fever.

Concerning Contagion.—Evidence slighter than in preceding cases. The only connection of this case with the others, that could be traced, was a visit of Frank Snyder, a brother of Rosa Snyder and of Mrs. Bromley (at whose house the disease had already appeared), and who lived across the road from Mr. Ormsby, whose wife and child had been dead about a week. The disease was communicated only to the family. Two out of a family of 6,—the father and mother,—escaped.

Additional Cases.—(Cases 32 to 34.) Lizzie, aged 13; attacked June 22; first symptom, sore throat; had a relapse. Georgie, aged 15; attacked June 24. Alice, aged 22; attacked Aug. 14 or 15. No fatal cases.

EIGHTH SERIES OF CASES.

(Family of Harvey Jones, a Farmer.)

Locality.—Seven miles north-west from Rochester; soil, sandy; situation, dry, high, and bleak.

House.—Twenty-nine years old; 80 rods from other houses; exposure, west; living-room lighted with three windows,—exposure, west; family had lived in it 12 years; no known history of diphtheria connected with it. Cellar under parlor, not under living-room; does not open into living-room; dry; stoned, bottom plastered with cement; vegetables not allowed to decay in it; swept every day, and mopped once a week; no disinfectants used. Fuel, wood, kept in a separate house, 40 feet from living-room; woodhouse new and clean at time of sickness; no rotten chips.

The living-room seems rather damp, standing on the ground without an underpinning. The man does not like to acknowledge this; but the woman admits it, and the neighbors are emphatic in their assertion that such is the case.

Water-Supply.—Drinking-water drawn by a bucket from a well 24 feet deep, containing about 10 feet of water; good in taste and smell, clear; tub and curbing in well; platform rather old; pretty well secured. Cistern-water used for washing.

Privy.—Over a pit in the ground; lime thrown in 3 or 4 times a year; moved every 3 years; 30 feet from well.

Persons Sick.—(Case 35.) George Jones, aged 10 years; attacked July 22, 1877; first attack. First symptom, sore throat. Principal symptoms, croupy breathing, afterwards paralysis of the legs. Disease ran 4 months. Boy recovered.

Concerning Contagion.—There is reason to suspect that the disease was received by contagion. The little boy went, the week before he sickened, to his grandfather Jones's, where a German girl living in the family was coming down with diphtheria. The history of this German girl I could not obtain, for the reason that she was moved to her own home south of Utica, and did not return. The little boy might have caught it from her, or his father, who had been at Bromley's, might have been the carrier of the infection. The disease was communicated to the subsequent cases in the same family. None but the father and mother escaped.

Additional Cases.—(Cases 36 to 38.) There were three additional cases: (1.) Lydia, 2½ years old; attacked July 27; sick 9 days; died August 6; first symptom, vomiting, sore throat not bad; died with croupy symptoms. (2.) Elmer, attacked July 30; died August 11, with croupy symptoms. (3.) John, attacked August 23; got well after four weeks' sickness.

The chain of evidence showing continuity of infection, which was weak in the preceding case, breaks entirely here, leaving these cases standing unconnected with the others. Had time permitted, it would have been profitable to make the effort to find the "missing link" that possibly connected, through the German girl mentioned above, these cases with the rest.

From this time, the date of the last case in the Jones family, the disease slept till the early part of November, when it re-appeared in its old malignant form, at a

point four miles south-west of Rochester, in the family of Joseph Toll. Two children buried in one coffin, were the last fatal cases. I went to the Toll place but the family were gone and I learned nothing concerning the history of their sickness.

FAMILY OF BARNETT MILLER.

Locality.—Country, 6 miles north of Rochester; soil, clay; situation, high, dry, and bleak.

House.—Built 13 years; 100 rods from other houses; exposure, north; living-room well lighted with three windows,—exposure, north; family has lived in it 9 years; no previous history of diphtheria connected with it. Cellar, not under living-room, but under parlor; opens into pantry; dry, unless the drain became stopped; then water accumulated in it; clean; vegetables not allowed to decay in it; no disinfectants used. Fuel, wood, kept in a pile; wood-yard 50 feet from living-room, cleaned every Spring, generally, not always; no rotten chips.

Water-Supply.—Well and cistern; cistern, at time of sickness. The well goes dry winters. The cistern had no filter. Other points omitted, because the well-water was not in use.

Privy.—Over a pit in the ground; cleaned and moved; moved twice; 60 feet from well.

Persons Sick.—(*Case 39.*) Kate Miller, aged 20 years; attacked sometime in March; first attack. First symptoms, sore throat and fever. Principal symptoms, throat trouble and headache. Disease ran 4 weeks; woman recovered.

Concerning Contagion.—No reason known by family to suspect that the disease was received by contagion. The disease was communicated to a brother. The father and mother escaped.

Additional Cases.—(*Case 40.*) There was one additional case, that of a brother, a week later; not fatal.

On reaching "date of attack," it appeared that this case was previous to, and disconnected with the rest; but it is given as a sort of appendix, showing the important fact that diphtheria of a milder form existed about Rochester before the *malignant* outbreak.

What I have learned concerning this outbreak of diphtheria, which is the most malignant that ever fell under my notice, is contained in the foregoing imperfect notes.

They are not reported to your Board in the expectation that any decisive conclusions can be drawn from them. They are too few for that.* They are offered as a contribution to that mass of particulars which must be accumulated before generalizations can be made. As far as they go, they seem to give an affirmative answer to the first query (concerning contagious nature), to render it probable that unsanitary conditions increase the malignancy of the disease, and to discredit the theory of its local origin. As to the first, it must be remarked, that with regard to diphtheria, the wholesome dread which tends to restrict the spread of small-pox does not exist. This, if diphtheria is really a contagious disease, is bad, but will soon be corrected when the community becomes convinced of the error. This point, then, should be settled as speedily as possible and the result placed before the public.

If the true answer to the second query is affirmative, the knowledge of the fact to the community is also of the greatest importance. How are we to account for the fact that a disease that has been endemic for years in a mild form, in a certain locality, so that † it should almost cease to be dreaded, should suddenly blaze into such malignancy? We are compelled to admit, as a reply to this, that either some evolution has taken place in the poison, that has raised it to a higher degree of potency, or that some change has occurred in the constitution of the recipients. Perhaps both conditions may work together to produce the fatal result in the worst cases. Whether unsanitary conditions, such as bad drainage, bad ventilation, bad drinking-water, can cause any change in the disease germ outside we may never know; but

* [While it is true that the cases here recorded might not of themselves establish the fact of the contagiousness of diphtheria, that fact has already been established by numerous recorded experiences of such a character as to leave no reasonable doubt in the minds of sanitarians who have given the subject special study. These additional cases so carefully reported by Dr. Caulkins will not only serve to increase the strength of the evidence of this, but the report is especially valuable here, because it is home evidence on this important subject, by a careful observer of conditions within our own State.—Henry B. Baker, Sec'y S. B. of H.]

† Rochester seems to have been such an endemic home of diphtheria for some time, and to such an extent, that I have frequently heard the J. R. Wilson brothers praised for their success in its treatment with whiskey. The Wilsons are practitioners at Rochester, twins, partners, kind and agreeable gentlemen. One of them, the one that attended the most of the cases, was absent at Bellevue, but the other gave me valuable assistance.

that such conditions can unfavorably modify the constitutions of the attacked, and cause them to fall an easier prey, we may well believe. We can hardly believe that the diphtheritic poison could have been in the well-water at Patterson's, for in that case the other family that used the water would have been attacked; but we may believe that it (the water) aided in the transformation of the poison to higher malignancy. Very likely we may never know what the change is which the poison undergoes; but perhaps by diligent study we may learn to recognize the circumstances that favor it.

If the theory that the zymotic diseases are caused by a *contagium vivum*, be true, the nature of the change in the poison is quite conceivable. It may be compared to the changes that some insects undergo, not the metamorphoses through egg, larva, chrysalis, and imago, but the transformations known as alternate generation, in which we see the same insect living in different forms, and, perhaps, in different elements, in different generations, and leaving its progeny behind it in each form. Agassiz mentions one insect in which eight transformations occur before the cycle is complete, and the original form is regained. In some of these forms the insect may be harmless, and in another very injurious. An example of this is the phylloxera, or grape-vine louse, the study of whose habits has made our countryman, Prof. C. V. Riley, so famous as a naturalist, and which, as its name denotes, lives in one of its forms on the leaf of the vine, making it curly and full of little galls. In this form it is comparatively harmless; but in another form it lives in the ground, on the root of the vine, and is very destructive, and has proved itself a most efficient ally of the temperance men, by ruining the wine industry of France. It may be that the contagium has its cycle, too, and in some stages of its evolution causes a mild, and in another a pernicious form of the same disease; or it may perhaps cause in its different stages, different, but allied diseases. This alternate generation, doubtless, takes place in the blood when the right conditions are presented, and those conditions may exist when that fluid is changed and poisoned by bad sanitary surroundings, such as drinking-water from wells containing sewage, air loaded with mephitic gases from cellars and holes under the house, dampness, want of sunlight, and all other causes that tend to change the blood from its normal condition. It may be objected that this is mere theory, unsupported by proof; but it must be admitted that it makes a good theory to work from.

It is, too, rendered quite probable by the different effects of the same contagium on different animals; as, for instance, the effect of the contagium of the rinderpest, which, inoculated into the blood of any of the ruminants, into that of a man or that of a mouse is quickly fatal, but inoculated into the blood of a dog, is harmless. Nothing presents smaller differences than the blood of the various species of mammals, and especially is this true of the blood of man and of the dog; but although neither the chemist nor the microscopist can tell the one from the other, the *Bacillus Anthracis*,—the parasite that causes the disease,—finds a difference, and thrives in the one and dies in the other.

From this behavior of the contagium of the rinderpest, it is easy to believe that the blood may have its changes from bad external influences, sufficient to explain the change from a mild to a malignant type of disease. When this change to malignancy is completed, it may be that the disease will attack in this form those members of the community that live under the best conditions.

Further observation is needed to show whether this is the case, and to throw light on many other points of equal interest, connected with the study of diphtheria.

These notes, too few for tabulation by themselves, are offered to the State Board of Health to serve as units in that necessary sum of observations.

Thorntown, Mich., Feb. 8, 1878.

JOHN S. CAULKINS.

In order to facilitate the study of the facts gathered by Dr. Caulkins, and their combination with other facts, it has seemed best to exhibit them in tabular form; accordingly, the following summary has been prepared in the office of the Secretary of the State Board of Health:

SUMMARY of Certain Facts mentioned by Dr. Caulkins in his Report of the Investigation of the Outbreak of Diphtheria at Rochester, Mich.

FAMILY OF	Date of First Attack in Family, 1877.	Date of Later Attacks in the same Family, 1877.	No. Sick.	No. Died.	Age of Persons Sick. Years.	Sex of Persons Sick.	Age of Decedents, Years.	Sex of Decedents.	Duration of Fatal Cases, Days.	Probable Origin of the Disease.
— Patterson	April 9.....	April 14, 19, 20.....	4	1	$\frac{3}{4}$, 2 $\frac{1}{2}$, 27, 50.....	{ 1 male, 2 fe. male, 1 un- known..... }	2 $\frac{3}{4}$	1 male.....	11.....	Contagion.
— Miller	April 20.....	{ 1, April 20; 2, May 5; 1, about June 1; 8, unknown..... }	{ 12 }	4	{ 3, 5, 7, 9, 19; { unknown..... }	{ 5 female, 7 unknown..... }	3, 5, 7, 9.....	4 female.....	{ 4, 6, 2; un- known..... }	Contagion.
— Hawken	May 8.....	Unknown.....	2	0	13; unknown.....	{ 1 male, 1 fe. male..... }	.....	.....	.....	Contagion.
W. H. Tillman	May 14.....	Unknown.....	4	2	2, 4, 10, 12.....	{ 3 male, 1 fe. male..... }	4, 12.....	{ 1 male, 1 fe. male..... }	4, 5.....	Contagion.
Herrick Bromley	June 4.....	Unknown.....	5	1	9; unknown.....	{ 2 female, 3 unknown..... }	9.....	1 female.....	3.....	Contagion.
William Ormsby	June 7.....	June 13; unknown.....	3	2	6, 27; unknown.....	{ 2 female, 1 unknown..... }	6, 27.....	2 female.....	4, 5.....	Contagion.
Saron Beardsley	June 16.....	June 22, 24; Aug. 14.....	4	0	8, 13, 15, 22.....	{ 2 male, 2 fe. male..... }	.....	.....	.....	Contagion.
Harvey Jones	July 22.....	July 27, 30; Aug. 11.....	4	2	2 $\frac{1}{2}$, 10; unknown.....	{ 3 male, 1 fe. male..... }	2 $\frac{1}{2}$; unkn..	{ 1 male, 1 fe. male..... }	9, 12.....	Contagion.
Barnett Miller	March.....	1 week after first. 2 children buried	2	0	20; unknown.....	{ 1 male, 1 fe. male..... }	.....	.....	.....	Unknown.
Joseph Toll	November.....	in one coffin.....	{ 2* }	2	.....	2 unknown.....	Children.....	2 unknown.....	Unknown.	.....
					$\frac{3}{4}$ to 50; av. 12 $\frac{1}{2}$, excluding un- known, aver- age 10 $\frac{1}{2}$; ex- cluding also 1 aged 50 years.	11 male, 17 fe- male, 14 un- known.	2 $\frac{3}{4}$ to 27; av. 8; exclud- ing unkn.	3 male, 9 fe- male, 2 un- known.	2 to 12; aver- age 6, exclud- ing unknown.	.....
					42	14				

* Dr. Caulkins was not able to learn the history of the sickness in this family; there may have been more than 2 sick.

RELATIVE TO

SCARLET FEVER:

INCLUDING REPLIES OF THIRTY-ONE

CORRESPONDENTS OF THE STATE BOARD OF HEALTH

To Sixty-six Questions on the Subject of Scarlet Fever.

Compiled and arranged for publication in the office of the Secretary of the Board.

SCARLET FEVER.

A COMPILATION OF THE REPLIES, AND THE REPLIES OF THIRTY-ONE CORRESPONDENTS OF THE STATE BOARD OF HEALTH TO SIXTY-SIX QUESTIONS ON THE SUBJECT OF SCARLET FEVER,—THE QUESTIONS REFERRING ESPECIALLY TO THE SUSCEPTIBILITY OF PERSONS TO THE DISEASE, TO ITS RELATION TO OTHER DISEASES, TO THE CONDITIONS WHICH INFLUENCE ITS SPREAD, AND TO METHODS FOR ITS RESTRICTION.

The second circular issued by this Board, in Oct., 1873, called attention to the great numbers of deaths from scarlet fever, and recommended means by which it was believed this number could be reduced. The Vital Statistics for 1870 and 1871 showed that, consumption excepted, scarlet fever then caused more deaths in this State than did any other disease. With this idea in mind, at the meeting of the State Board of Health, in April, 1876, Dr. Baker offered the following:

In order to obtain and place before the people, facts relative to the spread of scarlet fever, more particularly in this State, and the mortality resulting therefrom among the inhabitants of Michigan, I move that Dr. Hazlewood,—Committee on Epidemic Diseases, etc.,—be requested to plan a circular asking for reports of cases and all information bearing upon the dissemination and restriction of this disease; and that, when planned, the Secretary be directed to submit a copy of the proposed circular to each member, in the manner heretofore adopted, with the view of making the circular as nearly perfect as possible; and that, when the circular has been perfected and approved by a majority of the members of the Board, it be printed and sent, together with stamped envelopes and a request for replies, to the correspondents of the Board.

The motion prevailed.

Dr. Baker also offered the following preamble and motion:

While recognizing the truth of the proposition, that our knowledge of the prevention of scarlet fever may in the future be greatly advanced, I believe it is important to state clearly what now seems established as proper and desirable to be done.

Considering the fact that hundreds of deaths from this disease occur in this State in every year, a large proportion of which it is believed might by proper measures be prevented, it seems proper to place before the people immediately, those methods for its restriction which have already been made to appear important.

I therefore move that Dr. Hazlewood, Committee on Epidemic Diseases, etc., be requested to prepare a set of instructions on this subject which shall aim to do for the prevention of scarlet fever, what has been done by this Board for the prevention of deaths from drowning,—that is, place before the people in a condensed and easily understood form, the best methods of procedure for this purpose; that when his plan has been matured, the Secretary be directed to have copies sent to each member of the Board for examination and suggestions; and that Dr. Hazlewood be asked to present it in an amended form at the next meeting of the Board, to the end that

when finally approved by a majority of the members of the Board, a large number of copies be printed for distribution to local boards of health, to correspondents, and others, more especially to physicians in practice in this State.

The motion prevailed.

The preparation of these papers occupied a year, during which time they were revised and enlarged by other members of the Board. In April, 1877, the Board ordered them printed and distributed. The "set of instructions" entitled, "Restriction and Prevention of Scarlet Fever", has been largely distributed over the State, and is now printed in the first part of this volume. The "Circular" was sent to the correspondents of this Board, and their replies furnish the basis for this article. These replies are very valuable, for the matter they contain, and also because they show that physicians are awake to the importance of this disease, and are becoming well informed as to the best means for its restriction and prevention. The time is not long since many people, and physicians even, believed that scarlet fever was not contagious; but evidence has been heaped on evidence until, now, there is, in the minds of those who have given the subject the most consideration, no doubt of the contagiousness of the disease. These replies contain many instances where the communication of the disease has been as clearly traced as it could be in an epidemic of small-pox; and no one doubts that small-pox is a contagious disease. When we add to this the fact that scarlet fever has been conveyed by inoculating a healthy person with the poison of the disease (Ziemssen's Practice of Medicine, Vol. II., page 162), it would seem that no person with the facts in mind can hesitate to declare scarlet fever a communicable disease. This fact being established, in order to accomplish anything for the restriction of the disease, it is important that the people generally come to understand that it is carelessness, such as in other affairs of life is usually considered criminal, to permit needless exposure to this disease. It is also important that the people understand that the contagium of the disease can be destroyed by heat or by other disinfectants. As soon as these facts are understood, the sickness and deaths from scarlet fever will be diminished in proportion as people put into practice what they know on the subject.

The Circular to which these replies have been made, was as follows:

[17.] CIRCULAR TO CORRESPONDENTS RELATIVE TO SCARLET FEVER.

OFFICE OF THE STATE BOARD OF HEALTH, }
LANSING, MICHIGAN, April, 1877. }

To the Correspondents of the State Board of Health:

GENTLEMEN:—This Board desires to collect evidence concerning Scarlet Fever, particularly with reference to the dissemination and restriction of the disease; and with that purpose in view, requested Dr. Arthur Hazlewood, of Grand Rapids—then the committee of this Board on Epidemic Diseases, etc.,—to plan this circular.

Will you have the kindness to send to the office of this Board at Lansing, replies to the following questions, and to add such remarks, detailed histories of cases, or other facts within your knowledge, as will further the object of these inquiries? Please use the stamped envelope enclosed herewith, and leave all additional postage

to be paid at this office. In replying it will not be necessary to repeat the questions, but simply to refer to the Circular, and to each question by number.

1. What was the age of the youngest case of Scarlet Fever observed by you?
2. In how many cases have you observed the disease in new-born children?
3. In how many cases have you observed the disease in nursing children?
4. What was the age of the oldest case observed by you?
5. At what age are persons most liable to contract Scarlet Fever?
6. At what age is there greatest danger of death if the disease is contracted?
7. In your locality, what proportion of the inhabitants have had the disease?
8. To what extent have you observed second attacks of this disease?
9. In such cases, what has been the length of the interval between attacks?
10. What influence has season of year upon number of cases?
11. What have you observed as to influence of humidity or of dryness of atmosphere upon the disease or upon its dissemination?
12. What influence have you observed due to heat or cold?
13. What have you observed as to the influence of imperfect ventilation on the disease, or of thorough ventilation on its restriction?
14. What, as to location of dwellings, school-houses, or other buildings, especially in relation to damp cellars, cesspools, ditches, and swamps?
15. What, as to number or severity of cases in relation to the condition of soil in immediate vicinity?
16. What have you observed as to cases in vicinity of slaughter houses?
17. What, as to any connection of this disease with a disease of fowls or of any animal?
18. What, as to any relation of this disease to the use of flesh of fowls or of any animal as food?
19. What influence on liability to the disease is due to previous condition of health or occupation?
20. What have you observed as to any relation of Scarlet Fever to Diphtheria?
21. What have you observed as to any relation of Scarlet Fever to Rheumatism or to Heart Disease?
22. What, as to any relation of this disease to Typhoid Fever?
23. What, as to any relation of this disease to Measles?
24. What, as to any relation of this disease to Whooping-Cough?
25. What, as to any relation of this to any other disease?
26. What has been the proportion of mild to severe cases of Scarlet Fever, under your observation?
27. What has been the highest temperature of a person sick with this disease, and what was the result of such case?
28. In what proportion of cases is Scarlet Fever accompanied by complicating diseases?
29. In what proportion of cases is it accompanied by albuminuria?
30. In what proportion of cases is it followed by dropsy?
31. In what proportion of cases is it followed by other sequela?

32. Give any evidence on the question,—are persons recently operated upon, or wounded, more liable to be affected by Scarlet Fever?
33. What evidence have you concerning the influence of occupation of up-stairs bedrooms, in the prevention or mitigation of this disease?
34. Has complete isolation of persons sick with, or convalescing from, this disease been tried in your vicinity or under your observation?
35. What evidence have you of the effect of complete isolation of persons sick with or convalescing from Scarlet Fever, on dissemination or restriction of this disease?
36. Under your observation, has dry heat been applied for the disinfection of clothing or other material infected with this disease?
37. If you reply "yes" to question 36, please state conditions, methods, and results.
38. Under your observation, has thorough long-continued application of strong chlorine or sulphurous acid gas been made for the disinfection of material infected by this disease?
39. If you reply "yes" to question 38, please state conditions, methods, and results.
40. Aside from exposure to contagion, what influence has school life on the disease or on its dissemination?
41. What have you observed as to the influence of social position?
42. What, as to the influence of nativity of persons or parents?
43. What influence has sex upon the disease or upon its dissemination?
44. Within your observation, what has been the shortest stage of incubation?
45. Within your observation, what has been the longest stage of incubation?
46. Please report what facts you can as to the communicability of the disease by the clothing of attendants, of the physician, by occasional visitors, or by animals.
47. Please give any facts you can tending to show that the disease may be communicated, after a longer or shorter time, by furniture, carpets, bedding, or wall paper, which have not been disinfected except by a free exposure to pure air.
48. Please report any facts which prove that the contagium was conveyed by milk or any other article of food.
49. At what stages of the disease may it be communicated?
50. At what stage of the disease is there greatest danger of communicating it?
51. Have you any evidence as to when contagiousness ceases?
52. What class of cases are most likely to communicate the disease?
53. In your opinion, what secretion, excretion, or derivative of the body has most often conveyed this disease?
54. What evidence have you, and what is your belief as to the usual manner in which the contagium enters the body to produce the fever?
55. Have you any evidence or belief as to the manner in which the contagious principle acts to produce the disease?
56. In the greatest number of cases under your observation, how long after the attack does desquamation begin?
57. In exceptional cases, how long before desquamation begins?

58. In the greatest number of cases under your observation, how long after the attack before desquamation ceases?
59. In exceptional cases, how long before desquamation ceases?
60. Under your observation, what is the average duration of cases that recover?
61. Under your observation, what is the average duration of fatal cases?
62. In fatal cases, what symptom has been most prominent at time of death?
63. Under your observation, what is the average proportion of deaths to cases?
64. Please communicate any facts bearing upon, or cases illustrating, the causation or communication of this disease.
65. Please give all known details of any cases under your observation, which were apparently spontaneous.
66. Please give any suggestions which you deem important and practicable, for the prevention of sickness or deaths from this disease in your locality or in the State.

It may be well to preserve this circular for future reference whenever there is opportunity to study the disease; for our knowledge and control of this disease will be most rapidly advanced when each observer has clearly in mind the precise points upon which it is desirable to have information,—either for the use of the medical profession or for convincing those who have given less study to the subject, but whose action decides the question of the dissemination or restriction of the disease.

By direction of the State Board of Health.

Very respectfully,

HENRY B. BAKER.

Secretary.

The replies by the 31 correspondents have been compiled by subjects, summarizing the replies to each question, in order to exhibit in a condensed form the evidence relating to the subject of each question. The summary is as follows:

EXHIBIT 8.—Summary of Replies, by 30 Correspondents of the State Board of Health, to the first 9 Questions in Circular 17, Relative to Age of Persons Sick with Scarlet Fever, to the Proportion of Inhabitants that have had the Disease, and to Second Attacks of Scarlet Fever.

DIVISIONS, LOCALITIES, AND CORRESPONDENTS.	Age, in Months of Youngest Case. 1 *	Cases in New-Born Children. 2 *	Cases in Nursing Children. 3 *	Age of Oldest Case, in Years. 4 *	Age, in Years, of Greatest Liability to the Disease. 5 *	Age, in Years, of Greatest Ratio of Deaths to Cases. 6 *	Per Cent. of Inhabitants who have had the Disease. 7 *	Cases of Second Attacks. 8 *	Interval between At- tacks, in Years. 9 *
ALL OBSERVERS.....	4 days.†	1 †	Several.†	65 †	3 to 10 †	Under 10. †	37 †	A few.†	$\frac{1}{2}$ to 20 †
WESTERN DIVISION.†									
Ludington, Mason Co., E. N. Dundas, M. D.....	$\frac{1}{2}$	None.	Several.	45	1 to 10	1 to 5	50	2	$\frac{1}{2}$
Rockford, Kent Co., D. W. C. Burch, M. D.....	3	None.	5 pr. ct.	19	4 to 12	Very young.	50	4	About 4
CENTRAL DIVISION.†									
Charlotte, Eaton Co., G. B. Allen, M. D.....	6	None.	Few.	27	10 to 12	3 to 10 or 12	8	None.	None.
De Witt, Clinton Co., G. W. Topping, M. D.....	12	None.	2	35	5 to 10	5 to 10	5	None.	None.
Howell, Livingston Co., C. V. Beebe, M. D.....	36	None.	None.	14	3 to 5	Earliest.	-----	None.	None.
N. Lansing, Ingham Co., O. Marshall, M. D.....	$\frac{1}{2}$	None.	10	47	3 to 12	1 to 7	40	5	2 and 3
Otisville, Genesee Co., A. W. Nicholson, M. D.....	$\frac{1}{4}$	None.	2	28	3 to 10	Below 10	50	4	{ 3 cases, 1; 1 case, 10.
Vernon, Shiawassee Co., D. C. Holly, M. D.....	3	None.	6	15	1 to 15	Youngest.	No epidemic.	None.	None.
BAY AND EASTERN DIVISION. †									
Bay City, Bay Co., W. H. Burr, M. D.....	18	None.	1	21	-----	-----	-----	None.	None.
Bay City, Bay Co., Wm. R. Marsh, M. D.....	14	None.	None.	14	3 to 7	3 to 5	-----	None.	None.
East Saginaw, Saginaw Co., N. H. Cladin, M. D.	18	None.	None.	15	3 to 6	3 to 5	12	2 or 3	5 to 11
Lapeer, Lapeer Co., A. Nash, M. D.....	2	None.	6	30	2 to 12	2 or 3	50	None.	None.
Port Huron, St. Clair Co., C. M. Stockwell, M. D.....	4 days,	1	10	35 or 40	2 to 12	Under 5	3	4	10 to 20
Thornville, Lapeer Co., J. S. Caulkins, M. D.....	12	None.	A few.	37	5 to 15	Not very young.	20	None.	None.
SOUTH-WESTERN DIVISION.†									
Allegan, Allegan Co., H. S. Lay, M. D.....	18	None.	None.	40	2 to 8	2 to 5	12	1	$\frac{1}{2}$
Mattawan, Van Buren Co., T. H. Briggs, M. D.....	36	None.	None.	20	3 to 5	13 to 15	45	2	4
Otsego, Allegan Co., Milton Chase, M. D.....	24	None.	None.	19	2 to 10	4 to 8	Small.	Few.	2 and over.

St. Joseph, Berrien Co., R. F. Stratton, M. D.-----	$\frac{1}{4}$	None.	2	20	2 to 6	4	50	Many.	1 to 2
SOUTHERN-CENTRAL DIVISION.†									
Augusta, Kalamazoo Co., Wm. Worsfold, M. D.-----	3	None.	Several.	40	1 to 10	$2\frac{1}{2}$ to 3	-----	Several.	5 and 12
Brooklyn, Jackson Co., E. N. Palmer, M. D.-----	13	None.	2	19	1 to 5	Under 2	-----	None.	
Kalamazoo, Kalamazoo Co., W. B. Southard, M. D.-----	3	None.	Many.	30	1 to 10	3 to 5	30	5 pr. et.	
Mendon, St. Joseph Co., H. C. Clapp, M. D.-----	6	None.	1	18	Weaning to 9	{ Under 7 and } { over 10. }	20	None.	
Sturgis, St. Joseph Co., N. I. Packard, M. D.-----	6	None.	Many.	47	3 to 10	-----	75	None.	
Three Rivers, St. Joseph Co., C. W. Backus, M. D.-----	18	None.	None.	16	2 to 12	2 to 10	-----	None.	
Three Rivers, St. Joseph Co., L. S. Stevens, M. D.-----	8	None.	Several.	18	3 to 5	2 to 4	-----	None.	
SOUTH-EASTERN DIVISION.‡									
Detroit, Wayne Co., W. H. Rouse, M. D.-----	5	None.	A few.	17	1 to 12	2 or 3	Large.	3 pr. et.	Various.
Milford, Oakland Co., Robt. Johnston, M. D.-----	10	None.	3	45	4 to 8	Under 1	50	None.	
Pontiac, Oakland Co., W. G. Elliot, M. D.-----	4	None.	2 or 3	35	5 to 10	5 to 10	75	A few.	3 to 5
Pontiac, Oakland Co., John P. Wilson, M. D.-----	-----	None.	Very few	-----	2 to 14	-----	-----	-----	-----
Wyandotte, Wayne Co., E. P. Christian, M. D.-----	1½	None.	Many.	65	$\frac{1}{2}$ to 12	Under 5	65	Rare.	Several.

* These numbers refer to questions in Circular 17, printed on pages 394-7 of this Report.

† For a fuller summary of the replies to this question, see, on page 400, the paragraph having the same number as the head of this column.

‡ For counties in each Division, see Exhibit 1, page 171.

1.* Of the 31 correspondents who reply to the circular, 29 make some statement in answer to question 1. The ages of youngest cases seen by these vary from 4 days to 3 years; the average of the ages given is 9.7 months. One gives 4 days as the age of the youngest case observed; one, 10 days; five report the age of youngest case below 1 month; 7, below 3 months; 13, below 6 months; 18, below 1 year; 26, below 2 years; 29, at or below 3 years (2 of them at 3 years).

2.* In answer to this question, 29 correspondents say that they have observed no case of scarlet fever in new-born infants; 1, that he has seen one such case; 1 makes no statement.

3.* Of the 31 correspondents who reply to the circular, 30 make some statement in answer to this question; 7 say that they have seen no case of scarlet fever in nursing children; 4, that they have seen a few cases; 3, that they have seen several cases; 3, that they have seen many cases; 1, that he has seen it in 5 per cent of cases observed; 13 give the number of cases, the numbers ranging from 1 to 10, and averaging 4.

4.* In reply to this question, 29 correspondents give the ages of oldest cases observed. The ages range from 14 to 65, and average 29 years. One gives 65 years as the age of the oldest case observed; 7 report the age as above 39; 13, as above 29; 18, as above 19; 11, as below 20.

5.* Twenty-nine correspondents reply to question 5. The replies are difficult to summarize, but one view of them may be given as follows: one correspondent gives 6 months as the youngest age of greatest liability to the disease; only 6 place it above 3 years; only 4 place the oldest age of greatest liability below 6 years; the age of "from one year" is included within the age of greatest liability, by 8 correspondents; that of 2 years, and "from 2 years," by 15; of 3 years, and "from 3 years," by 23; of 4 years, and "from 4 years," by 25; of 5 years, and "from 5 years," by 28; of 6 years, and "to 6 years," by 25; of 7 years, and "to 7 years," by 23; of 8 years, and "to 8 years," by 22; of 9 years, and "to 9 years," by 20; of 10 years, and "to 10 years," by 19; of 11 years, by 11; of 12 years, and "to 12 years," by 11; of 13 years, by 3; of 14 years, and "to 14 years," by 3; "to 15 years," by 2. The ages from 3 to 10 years are included within the age of greatest liability, by a majority of the correspondents who reply to this question.

6.* Twenty-eight correspondents reply to this question. Only 3 place the maximum limit of age of greatest mortality above 10 years; only 9, above 5 years.

7.* Twenty-four correspondents reply to question 7. One says that there has been no epidemic; one, that a "small per cent" of the population have had the disease; one, that a "large proportion" have had it; 19 give the estimated per cent of population who have had the disease, the per cents ranging from 3 to 75 and averaging 37.

8.* Twenty-nine correspondents reply to question 8. Of these, 14 say that they have observed no second attack; one has seen many cases; one, several; 3, a few cases; 8, a total of 24 cases; one reports as second attacks, 3 per cent of cases observed; and one, 5 per cent.

9.* Fifteen correspondents reply to question 9, giving intervals which vary from 6 months to 20 years.

10.* Four correspondents make no statement in answer to question 10; one

* The figures beginning paragraphs refer to questions in Circular 17, sent out by this Board. The Circular is printed on pages 394-7 of this Report.

says, "Winter and Spring months," and one, "Increases prevalence and intensity,"—answers which are equivalent to no statement. One says that the most cases occur in warm weather (perhaps on account of greater travel); one, that the disease prevails most severely in cold and damp weather. The disease is reported as most prevalent in cold weather by 3 correspondents: in Winter, by 4 (one of them saying, also, "severest in type"); in Spring and Fall, by 2; in Spring, Fall, and Winter, by 2 (one of them saying, in "open Winters"); in Spring months, by 1; in Winter and Spring months, by 2; between Dec. and May, by 2; in Jan., Feb., and March, by 1; in Feb. and March, by 1; in March, April, Jan., Feb., Oct., and Sept. (months named in order of greatest frequency of cases), by 1. One says, "Mildest cases in Summer; severest in Spring;" and one, "March and April seem to breed the most sequelæ."

11.* This question seems to have been misunderstood by most of the correspondents who attempted to reply. It is therefore clear that the question should have been more carefully worded. The reason why they did not get the intended meaning may have been that they mistook "humidity" for "relative humidity." The meanings of these terms, as applied to this question, may, under some circumstances, be almost directly the opposite of each other. "Humidity," being the *amount* of moisture in the air at any given time, is greatest in Summer, while "relative humidity," referring, as it does, to the *per cent of saturation*, is usually greater in Winter, because the capacity of cold air to hold moisture is much less than that of warm air, and therefore a smaller quantity is required to saturate it.

12.* In answer to this question, 11 correspondents make no statement; 6 say that they have observed no influence due to heat or cold; one, that he has observed nothing, except from ventilation; one, nothing but that relative to season; 5, that cold weather is favorable to the spread of the disease (one of them saying, "a cold, humid atmosphere;" and one, that the disease is also more severe in cold weather); one, that it is aggravated by cold, especially with humid atmosphere; one, that more fatal cases occur in cold weather; one, that it makes cleaner work in cold weather, because of less ventilation and greater concentration of the disease; one, that changes from heat to cold favor it; one, that cold weather (below 32° F.) preserves the contagium indefinitely, warm weather very soon destroys it; one, that better ventilation and lighter clothing and bedding, in hot weather, tend to prevent concentration of the poison; one, that cold atmosphere is preferable.

13.* In answer to this question, 10 correspondents make no statement; 11 say that good ventilation checks the spread of the disease; 17, that the cases are less severe where the ventilation is good; one says that he has observed nothing uniform.

14.* In answer to this question, 6 correspondents make no statement; 13 say that they have observed nothing as to location of dwellings, etc.: one, that he has observed nothing uniform; one, that he does not believe it has any impression on it; the other 10 either affirm or give cases illustrating the unfavorable influence of location near damp cellars, cesspools, etc., on the disease.

15.* In answer to this question, 9 correspondents make no statement; 15 say that they have observed nothing as to the point in question; one has observed a great diversity of soil in different cases; one says that it prevails with more severity in marshy districts; one, more severely where the soil is saturated with water; one, that cases are more severe and more numerous near low land; one, that the most cases, but not the severest, occur in the southern part of the

city, which is low and on clay soil; one, that soil in vicinity of a majority of cases is sandy loam; one has observed nothing except that houses over clayey soil are more liable to be damp; one tells of 3 very malignant and fatal cases in one family, their play and sleeping room being over very moist soil, while an older boy who slept up stairs escaped with a slight attack. In this case, it is possible that the older age of the boy who slept up stairs may have had some share in favorably influencing the disease.

16.* In reply to this question, 8 correspondents make no statement; 21 say that they have observed nothing as to cases in question; one, that they are more severe; and one, that 4 cases occurred near a slaughter-house when there were no other cases in the city.

17.* In reply to this question, 10 correspondents make no statement; 20 say that they have observed nothing as the connection of scarlet fever with diseases of fowls or of animals; one thinks a certain horse distemper is of the same nature as scarlet fever.

18.* In reply to this question, 10 correspondents make no statement; 20 say that they have observed nothing as to any relation of this disease to use of flesh of fowls or animals as food; one thinks that those who eat swine's flesh are more subject to the disease, and that they have it in severer form.

19.* Ten correspondents make no statement that answers this question; 11 say that they have observed no influence due to previous condition of health or occupation; one, that the influence is the same as in other contagious diseases; 8, that debility increases susceptibility to the disease (one of them saying, also, that the poorer classes, and one, that poorly-fed patients, are more susceptible).

20.* In answer to this question, 5 correspondents make no statement; 12 say that they have observed nothing as to any relation of scarlet fever to diphtheria: one, that he has not seen true diphtheria with scarlet fever; one, that he has observed no necessary connection,—though throat difficulties are common in some epidemics; 12 make statements which imply a more or less intimate relation of the two diseases, but which cannot well be summarized.

It seems probable that the contagium of scarlet fever is more likely to find lodgment in the throat, and entrance into the system, when, from any cause, the throat is "raw" or inflamed; because the mouth is not always closed at the time of breathing in air, and at such times any floating particles of contagium are liable to be caught in the throat, and more than usually liable to gain entrance into the circulation, or first into the lymphatic system, and, finally, into the circulating fluids of the body.

21.* Eight correspondents make no statement that answers this question; 9 say that they have observed no relation of scarlet fever to rheumatism or heart-disease; another, that he has observed nothing unless there was previous predisposition; 2, that they have observed affections of joints, in connection with scarlet fever, which they did not, however, consider to be rheumatism; 11 make statements that imply a more or less intimate relation of scarlet fever with rheumatism or heart disease.

22.* Ten correspondents make no statement that answers this question; 18 say that they have observed no relation of scarlet fever to typhoid fever; one, that a typhoid form of fever frequently follows scarlet fever, but he has observed no relationship to specific typhoid fever; one, that frequently pathological changes in scarlet fever include all those of first stage of typhoid fever;

*The figures beginning paragraphs refer to questions in Circular 17, sent out by this Board. The Circular is printed on pages 394-7 of this Report.

one, that, in the immediate neighborhood where 13 cases of typhoid fever preceded an epidemic of scarlet fever, the scarlet fever was most malignant.

23.* Eight correspondents make no statement that answers this question; 13 say that they have observed no relation of scarlet fever to measles; one, that they seldom go hand in hand; 9 make statements which imply a more or less intimate relation of scarlet fever to measles; one says the two diseases "are liable to follow one another".

24.* Eleven correspondents make no statement that answers this question; 18 say that they have observed no relation of scarlet fever to whooping-cough; one, that whooping-cough followed the epidemic of 1875-6; one, that on account of the preservative power of cold weather over all kinds of contagia, scarlet fever and whooping-cough are likely to occur together in cold weather.

25.* Ten correspondents make no statement that answers this question; 15 say that they have observed no relation of scarlet fever to any other disease than those mentioned in questions 20-24; one, that many diseases and affections are induced by scarlet fever; one, that he has observed similarities, but he can prove no direct connection; one, that parturients are likely to be unfavorably affected by scarlet fever in their immediate vicinity; one, that he has observed a predisposition to dropsy; one, that albuminuria, dropsy, catarrh, otorrhea, and abscess are frequent sequelæ; one, that on account of the preservative power of cold weather over all kinds of contagia, any infectious or contagious disease is likely to occur at the same time with scarlet fever, in cold weather, and that erysipelas is a very ordinary precursor or concomitant of scarlet fever.

26.* In answer to this question, 5 correspondents make no statement; one says that there are more severe cases than mild; one, "average mild cases. I have never met any serious general epidemic"; the other 24 state the actual or approximate ratio of mild to severe cases; but as in regard to some of them it is uncertain whether the per cent given for mild cases is of severe cases or of total cases, they are not summarized.

27.* In answer to this question, 6 correspondents make no statement; 11 say either that they have not observed the temperature or that they have no record; the other 14 give highest temperature observed, ranging from 104° F. to 108° F. One gives 104° as the highest temperature observed, but does not state result; one gives 104°,—result, recovery; one, 105°, and one, 105.5°,—result, recovery; one, 106°,—result, recovery; three, 106°,—result, death; three (one of them, however, being included in the four next mentioned), 107°,—result, death; four, 108°,—result, death.

28.* Eleven correspondents make no statement that answers this question; one says that in no case is scarlet fever accompanied by complicating disease; 5 that it is seldom thus accompanied; one, that it is so accompanied in nearly all cases; one, that it varies with the epidemic; the other 12 give the per cent of complicated cases, the per cents ranging from 3 to 70, and averaging 24.

29.* Fourteen correspondents make no statement that answers this question; scarlet fever is said to be accompanied with albuminuria in some cases, by 2 correspondents; very generally, by one; in the greater proportion of cases, by 2; in a large proportion, by 2; in all cases tested, by one. Nine give the actual or approximate per cent of cases accompanied by albuminuria, the per cents ranging from 1 to 75, and averaging 19.

30.* Nine correspondents make no statement that answers this question; one says that scarlet fever is followed by dropsy in some cases. Twenty-one give

the actual or estimated per cent of cases in which it is followed by dropsy, the per cents ranging from 1 to 40, and averaging 11.

31.* Twelve correspondents make no statement that answers this question; one says that scarlet fever is followed by other sequelæ than dropsy, in a small per cent of cases; 18 give the actual or estimated per cent of cases in which it is followed by other sequelæ, the per cents ranging from 2 to 50, and averaging 16.

32.* In answer to this question, 11 correspondents make no statement; 17 say that they have no evidence on the question; one says that persons recently operated on or wounded are not more liable to be affected by the disease; one, that he thinks they are not; and one, that he thinks they are not, except as the system may be rendered more liable by prostration.

33.* In answer to this question, 10 correspondents make no statement; 17 say that they have no evidence; one says that there is no difference; one, that the weight of evidence favors up-stairs rooms; one, that as an up-stairs location is favorable for isolation and ventilation, the result is prevention and mitigation; one, that in 8 of 11 families who lived *over stores*, 25 persons (the only persons in these families who were under 15 years of age) had scarlet fever; and that of the 3 persons under 15 in the other 3 families, 1 had scarlet fever, 1 was born during the epidemic, and 1 was black.

34, 35.* Five correspondents make no statement in answer to either of these questions; 11 say, "Yes," in answer to question 34, and 8 of them state, in answer to 35, that the result of isolation has been successful restriction of the disease; one of them, that isolation often prevents the disease; one of them, that those who have kept away from the disease have escaped in nearly every case, and that there are many such; and one of them details two cases of successful restriction by isolation; 12 say, "No," in answer to question 34; one, "only so far as possible in family dwellings;" one, "only to a limited extent, and that in favor of isolation;" one, that one epidemic was wide-spread where there was no isolation, and one was checked by isolation.

36, 37.* Seven correspondents make no statement in answer to either of these questions; 23 say, "No," in answer to question 36; one says, "Yes," and states, in answer to question 37, that the clothing, bedding, etc., were kept near a hot stove for several days, with a satisfactory result.

38, 39.* Six correspondents make no statement in answer to either of these questions; 20 say, "No," in answer to question 38; 4 say, "Yes," and state, in answer to question 39, that the disinfection was effectual; one says that he has used sulphur fumes and carbolic acid, but does not give method or result. Details of the methods of disinfection which were employed may be seen in the replies to question 39.

40.* Seventeen correspondents make no statement that answers this question; 8 say that, aside from contagion, school-life has no influence on the dissemination of scarlet fever; the other 6 refer to the crowding in small rooms, poor ventilation, foul air, changes to cold air, carelessness in dress, enervating influence of close confinement and excessive mental labor, and to the induced debility, as favoring the spread of the disease.

41.* Ten correspondents do not reply to this question; 9 say that they have observed nothing as to influence of social position; 4, that they have observed no difference except as hygienic conditions differ; one, none except as to

* The figures beginning paragraphs refer to questions in Circular 17, sent out by this Board. The Circular is printed on pages 394-7 of this Report.

means of procuring early and proper attendance and of supplying wants; one, that people just comfortably situated get along best; one, that high social position offers no immunity; two, that it is more common in lower grades of society (one of them saying also more fatal); another, that his worst cases have been among lower orders; one, that children well cared for are less liable to the disease; one, that high social position predisposes to the disease, and that such cases have it in more dangerous form.

42.* Eleven correspondents do not reply to this question; 18 say that they have observed nothing as to nativity; one says that more of foreign descent than of natives have the disease; one, that the Irish stand first, as to severity and fatality; Germans, next; next, English and Americans.

43.* Sixteen correspondents make no statement that answers this question; 9 say that sex has no influence on the disease or on its dissemination; 2, that females are more liable (one of them saying also that they are more liable to disseminate the disease); one, that more females have had it and more have died from it; one, that most of his patients were girls; one, that he has lost but 2 cases, both females; one, that females, because more exposed, disseminate the disease more.

44.* Twelve correspondents make no statement that answers this question; 19 state shortest stage of incubation as follows: two give 1 day as shortest stage; one, 36 hours; four, 2 days; four, 3 days; one, 4 days; five, 5 days; one, six days; and one, 7 days.

45.* Seventeen correspondents make no statement that answers this question; 14 give longest stage of incubation, as follows: one, 7 days; three, 10 days; five, 14 days; one, 16 days; one, 18 days; one, 20 days; one, 21 days; and one, 2 months.

46.* In reply to this question, 15 correspondents give cases of communication of the disease in ways mentioned. Details may be seen in the replies.

47.* In answer to this question, 10 correspondents give cases of communication of scarlet fever in ways mentioned. For details see the replies.

48.* One correspondent gives a case of apparent communication of scarlet fever by means of milk. See reply by O. Marshall, M. D. No other cases are mentioned.

49.* Six correspondents make no statement that answers this question; 25 say that the disease may be communicated in any stage from the beginning of the fever till the completion of desquamation.

50.* Eight correspondents make no statement that answers this question; one says that there is greatest danger of communicating the disease during the second stage; one, during continuance of rash and sore throat; one, during greatest febrile excitement; one, during febrile stage; 3, during the eruptive stage; one, at or near the eruptive stage; two, when there is most fever and sore throat; one, during highest stage of efflorescence, or at commencement of desquamation; one, about the commencement of desquamation; one, just before and at the time desquamation begins; one, during the fever and desquamative stage; one, as soon as the eruption makes its appearance and during desquamation; one, when the eruption is fully out and till desquamation is mainly completed; 4, during the desquamative stage; one, during the last stages; one, during stage of decline; one, that it depends on ventilation and disinfection.

51.* Nine correspondents do not reply to this question; 18 say that they have no evidence when contagiousness ceases; one, that it ceases when the

patient is entirely well and his clothing thoroughly renovated; 2, when desquamation has ceased; one, as to the patient, when scaling ceases, the scales will communicate the disease indefinitely.

52.* Fourteen correspondents make no statement that answers this question; 2 say that they know of no difference; one, any or all; 2, severe cases; one, gravior and epidemic; 3, the most malignant; one, the most putrid; one, those with high temperature and full general eruption, and those with severe complication of throat; one, severe cases, especially those with sore throat; one, those in which there is the greatest amount of throat trouble; 2, anginose cases; one, the malignant and anginose variety; one, those in which the mucous membrane is most extensively involved.

53.* Twelve correspondents make no statement that answers this question. The breath, stools, products of desquamation, emanations, and "all" the products of the body, are mentioned by the other 19 correspondents as most often conveying the disease.

54.* Seven correspondents make no statement that answers this question; 2 say that they have no evidence or belief; 13 state their belief that the contagium enters the body by inhalation; one, by inhalation and ingesta; one, that it enters by inhalation, and possibly in food and drink; one, through the lungs and by cutaneous absorption; one, by absorption, either through lungs or skin; one, through the circulation, the scales by the stomach, the effluvia are inhaled; one, through the buccal and respiratory mucous membranes; one, by absorption through mucous membrane; one, through alimentary canal and lacteals; one, that it is taken into the circulation.

On a preceding page, in the paragraph following the summary of replies to question 20, the compiler has suggested what may be the usual way in which the contagium of scarlet fever enters the body; namely, by lodgment of the contagium in the throat,—a mode similar to vaccination, except that the abraded surface is not purposely prepared, but is the result of exposure to cold or other irritant. This may help to explain why there are more cases of scarlet fever in cold than in warm weather.

55.* In answer to this question, one correspondent states the belief that the contagium acts as a zymotic poison, similar to that of small-pox; one, that it acts on fluids by a zymotic or an analagous process; one, that it acts as a blood-ferment, possibly of nature of the cryptogam; 4, that it acts as a ferment (one of them adding, "or a sort of catalytic action"); one, that it acts as a blood-poison; one, that the poison enters the blood through mucous surfaces of air passages and cells, and acts by contact; one, that it acts directly on the nerve centers, lowering vitality, and changing the blood. The other 21 either make no reply, or state that they are unable to reply.

56.* Twenty-seven correspondents state the usual interval between the attack and desquamation, as follows: two say about the fifth day of the eruption; one, 48 hours; 4, from 5 to 7 days; one, about 6 days; one, 6 or 7 days; 5, about a week; one, 6 to 8 days; one, 6 to 10 days; two, 7 to 10 days; one, 7 to 12 days; three, 8 to 10 days; one, 8 to 16 days; one, 1 to 3 weeks; one, 3 to 4 weeks; one, in severe cases, before the disappearance of the eruption,—in mild cases, from 5 to 10 days after the disappearance of the eruption; one, at the decline of the eruption. The other 4 correspondents do not reply.

57.* In answer to this question, 14 correspondents state exceptional periods

* The figures beginning paragraphs refer to questions in Circular 17, sent out by this Board. The Circular is printed on pages 394-7 of this Report.

before desquamation, as follows: one, 5 days; one, 6 days; one, 7 days; one, 8 to 10 days; three, 10 days; one, 12 to 14 days; one, 5 days to 2 weeks; one, nearly 2 weeks; one, 2 weeks; one, 2 to 3 weeks; one, 15 to 20 days; one, in one case, 5 weeks. The other 17 correspondents make no statement that answers the question.

58.* In answer to this question, 22 state the usual period between the attack and desquamation; one says about 9 days; two, 10 days; one, 8 to 10 days; one, 10 to 12 days; one, 14 to 16 days; 3, about 2 weeks; 3, about 3 weeks; one, 1 to 4 weeks; one, 2 to 4 weeks; one, about 20 days; one, 21 to 25 days; 2, 3 to 4 weeks; one, 3 to 5 weeks; one, 3 to 6 weeks; one, about 4 weeks; one, 4 to 6 weeks. The other 9 make no statement that answers the question.

59.* In answer to this question, 13 correspondents state exceptional intervals before desquamation ceases, as follows: one says 14 days; one, 15 days; one, 15 to 20 days; one, 2 to 3 weeks; one, not beyond 3d week; one, 3 weeks; one, over 3 weeks; two, about 30 days; one, 4 to 6 weeks; one, 5 weeks; one, 6 weeks; one, 3 months.

60.* In answer to this question, 25 correspondents state the average duration of cases that recover, as follows: one says 4 to 7 days; one, 8 days; 2, about 10 days; 2, 10 to 14 days; one, 1 to 2 weeks; one, 12 to 14 days; 5, 2 weeks; 2, 2 to 3 weeks; one, 15 days; one, 18 or 20 days; three, 3 weeks; one, 3 to 4 weeks; two, 4 weeks; one, 30 days; one, 14 to 40 days, generally 40. The other 6 make no statement that answers the question.

61.* In answer to this question, 23 correspondents state average duration of fatal cases, as follows: one says 36 hours, unless from sequelæ; one, 2 to 7 days; one, 3 to 6 days; one, 4 or 5 days; one, 5 days; one, 5 days or about 3 weeks from sequelæ; one, 5 to 6 days; one, 5 to 8 days; one, 5 to 10 days (in one case 6 hours); two, 3 to 10 days; one, about 7 days; one, 8 days; two, 10 days; one, 8 to 12 days; one, 11 days,—three-fifths die before the 8th day; one, 10 to 15 days; two, 2 weeks; one, 18 days; one, 2 to 4 weeks; one, 3 to 4 weeks. The other 8 make no statement that answers the question.

62.* Twenty-seven correspondents give the most prominent symptoms at the time of death from scarlet fever; among the most frequent are: throat symptoms, nervous prostration, coma or convulsions, and blood-poisoning. For details, see the replies.

63.* Eight correspondents make no statement that answers this question; 23 give the actual or estimated per cent of deaths to cases, as follows: one says that he has had no fatal cases; two report 2 per cent of cases as fatal; two, 3 per cent; one, 3 or 4 per cent; three, 5 per cent; one, 5 to 10 per cent; one, 20 per cent, in epidemic,—5 per cent afterwards; one, 15 per cent, in epidemic,—8 per cent, in whole experience; one, 7 per cent; one, 8 to 10 per cent; three, 10 per cent; one, 13 or 14 per cent; two, 15 to 20 per cent; one, 17 per cent; one, 18 per cent; one, 22 per cent. The average of the per cents given is 9 per cent.

64.* In answer to this question, 10 correspondents give cases and facts bearing on the question. For details, see the replies.

65.* In answer to this question, 19 correspondents either make no statement or say they have seen no spontaneous cases. The other 12 speak of cases apparently spontaneous.

66.* In answer to this question, 19 correspondents suggest as important and practicable for the prevention of sickness and deaths from scarlet fever, the following means, viz.: isolation, disinfection, ventilation, and cleanliness.

Other important measures are recommended, for which the reader is referred to the replies.

The replies to this circular are grouped by geographical divisions of the State (specified in Exhibit 1, page 171), and alphabetically by localities within the divisions. This is done because some of the questions relate to the locality of the observer; as, for instance, question 7, which asks the proportion of inhabitants who have had the disease; and this arrangement will facilitate any study of the disease by localities, or any comparison of statements relating to this disease, as reported by observers in different localities. As the compilations of weekly reports of diseases, and of the reports of the prevailing diseases in 1876,—printed on pages 167–343 of this Report,—have been made on this plan, any present or recent relation of scarlet fever to other diseases can, in this way, be more easily detected. It should be remembered, however, that only a few of the questions are asked with reference to locality, and some of the observers have recently settled in the localities from which they report; hence, many of the statements may be based on observations made elsewhere.

The replies are as follows:

WESTERN DIVISION OF THE STATE.*

REPLIES BY E. N. DUNDASS, M. D., OF LUDINGTON, MICH.

To the Secretary of the State Board of Health:

I submit the following answers to questions given in Circular No. 17 relating to Scarlet Fever:†

1. Two weeks old.
2. No positive knowledge of any. Only supposition.
3. Several times; could not say exactly.
4. Forty-five years.
5. From 1 to 10 years of age.
6. From 1 to 5 years old.
7. About 50 per cent.
8. Two cases came under my own observation, and several statements from patients.
9. From May to November of the same year.
10. Very little or none. When the weather is cold the houses are closed, the poison worse; the chance for ventilation not as good.
11. Nothing.
12. None, only the opportunity for ventilation.
13. Good ventilation has a great tendency to prevent the spread of the disease; and is much better for the patient.
14. Have never given it any consideration, and cannot call to mind anything special in regard to it.
15. Could not say; have never observed or found any difference that I can now call to mind.
16. Never had an opportunity of observing; no slaughter-houses within limits of corporation.
- 17, 18. None to my knowledge.
19. The same as in all other contagious diseases, and no more.
20. Have found the diphtheritic membranous formation in several cases about the tenth or twelfth day of the disease, not before, as nearly as I can remember.
21. Have found them as sequelæ; nothing special previous to the disease.
22. Nothing.
23. Have found them both in the same district at the same time, but have never found them in the same house together. They are liable to follow one another.
24. Nothing that I ever observed.
25. Nothing. It seems to be perfectly independent.

* For counties included in each Division, see Exhibit 1, page 171.

† The figures beginning paragraphs refer to questions in Circular 17, on pages 334–7 of this Report.

26. About equally divided.
27. Could not say positively.
28. Very few, other than the sequelæ.
- 29, 30. There are some cases, but I could not state positively.
31. The average of the different sequelæ may reach twenty-five per cent of the whole number of cases of scarlet fever.
- 32, 33. Have no evidence to offer.
34. Yes.
35. I believe that perfect isolation of the patient will result in perfect safety or escape of other members of the same family in the same house. It has been tried and proved to my own satisfaction in my own practice.
36. No.
38. No. Have used sulphur fumes and carbolic acid.
- 40, 41. Nothing.
- 42, 43. None.
44. Five days is the shortest that I remember.
45. As nearly as I can state, 20 days or thereabouts.
46. Mr. M. went to Saginaw on business; visited a house where about three months previously they had scarlet fever; remained over night, and came home. In nine days after his return he was taken sick with scarlet fever. He must have taken the disease from the bed-clothes. Mr. M.'s family had the disease at this time. He was a man about 40 years of age. A physician, coming the distance of about 200 miles, whose family had just recovered from scarlet fever, came and stopped in my family a few days; inside of two weeks the only member of my family that had not had scarlet fever was taken sick with the disease; a sister-in-law with two children who had not had the disease, were also sick with scarlet fever. Miss F., house-maid, left her brother-in-law's house, where two children were having scarlet fever in a mild form, so much so that the parents would not be convinced of the fact, and traveled the distance of 8 miles in an open sleigh to Mr. McR.'s and took charge of his house. Inside of a week one child was taken sick; inside of three weeks, five in all were sick. One was a child under three weeks old when taken sick.
47. Case of Mr. M.'s answered in "46"; will also answer "47".
48. Have no facts to give; but think it easily done.
49. At any stage; but more readily at the period of desquamation. At any stage of the malignant cases.
50. In the last stages of the disease.
51. When desquamation ceases.
52. Those that are the most putrid.
53. The secretion from the nose and throat and excretion from the alimentary canal.
54. The air passages are the avenues through which the body is affected with the poison.
55. I believe the poison enters the blood through the mucous surface of the air passages and cells. It acts by contact, poisoning all it comes in contact with.
56. Time varies, from 1 to 3 weeks, depending a good deal on the degree of severity or height of the temperature of the body during the disease.
57. I could not say to a day; have never made any special note, but have known them to vary a great many days in members of the same family.
58. I have known them to be from 3 to 6 weeks.
59. Could not give any special note over 6 weeks.
60. From 14 to 40 days; generally 40.
61. From 3 to 10 days.
62. Meningeal symptoms; and those attending the putrid form of sore throat.
63. About 13 or 14 per cent of the whole that have come under my observation for the past three years.
64. Answered in "46."
65. I have no knowledge of any spontaneous cases.
66. Perfect isolation from the disease, a protection against it; the strictest hygienic measures to be taken in the sick-room; cleanliness and fresh air, but not cold air.

I remain your obt. servant,

Ludington, Mason Co., Mich., May 9, 1877.

E. N. DUNDASS, M. D.

REPLIES BY D. W. C. BURCH, M. D., OF ROCKFORD, MICH.

Relative to Scarlet Fever.*

1. Three months.
2. None.
3. Have no record, but think 5 per cent.
4. Nineteen years.
5. From 4 to 12 years of age.
6. Very young.
7. Estimate, 50 per cent.
8. Four cases in 18 years' practice.
9. About 4 years.
10. Can not say.
11. About 12 years ago the disease spread during very dry weather, and 3 years ago, during very wet weather; the fatal cases were about the same in both instances.
12. Cold atmosphere preferable.
13. Several deaths that would not have occurred with free ventilation.
21. A predisposition to cardiac diseases.
35. A predisposition to dropsy.
26. About equal.
27. 104° F.; recovery.
28. Estimate, 5 per cent.
32. So far as my observations go, they are not.
34. Yes.
35. Perfect arrest of the spread.
- 36, 38. No.
44. Five days.
45. Sixteen days.
47. In the case where 16 days of incubation occurred, I traced the contagion to a bed occupied by a convalescing patient.
49. As long as there is a scale that may be swallowed by any person.
50. Second stage.
51. When scaling is complete the patient cannot communicate the disease; but the scales, if taken into the system, may communicate it for almost an indefinite time.
52. Malignant.
53. Scales and effluvia.
54. Through the circulation; the scales by the stomach; the effluvia by the lungs.
56. 48 hours, generally.
57. 5 days.
58. 8 to 10 days.
60. 15 days.
61. 5 days.
62. Prostration.
63. 10 per cent.
65. On the 21st day of April last I was called to see Jenny M., aged 13 years, suffering from scarlet fever. I have not been able, as yet, to trace the attack to contagion. If I should not succeed, it will be the first case under my observation.

Respectfully yours,

Rockford, Kent Co., Mich., May, 1877.

D. W. C. BURCH.

CENTRAL DIVISION OF THE STATE.†

REPLIES BY G. B. ALLEN, M. D., OF CHARLOTTE, MICH.

Secretary State Board of Health:

DEAR SIR:—I have the pleasure to inclose herewith answers to circular relative to scarlet fever. They may not be as complete as might be desired, but are, under the circumstances, the best I can do.*

1. About 6 months.
2. None.
3. Cannot give definite number; but not very many.
4. 27 years.

* The figures beginning paragraphs refer to questions in Circular 17, on pages 394-7 of this Report.
 † For counties included in each Division, see Exhibit I, page 171.

5. From 10 to 12 years.
6. From about 3 to 10 or 12 years.
7. Should think about 8 per cent.
8. None.
10. I cannot say. Believe that the winter seasons have larger number of cases.
11. Think that humidity has a tendency to favor dissemination.
12. Have not observed.
13. Perfect ventilation benefits, and I should think it would restrict.
14. Nothing. Have not seen cases under circumstances named.
15. Nothing.
16. Have observed no cases.
17. Have observed no connection.
18. None.
19. From personal observation, cannot say that previous health or occupation has any particular influence.
20. There has been, in some cases, a very close relation. In some instances diphtheria preceded, for some days, the eruption of scarlet fever, and had all the characteristics of the former disease. In other cases the diphtheritic inflammation supervened in the usual course of the fever.
21. Have observed no relation to the diseases named, unless there were previous predisposition, or complication.
22. No relation observed.
- 23, 24. Nothing.
25. Can call to mind nothing.
26. I should think about 1 to 10.
27. In my observation 105° has been the highest; the result was recovery.
28. In nearly all.
29. Should think nearly 75 per cent.
30. Should think about 7 per cent.
31. About 8 or 10 per cent.
32. Have no evidence.
33. Have no evidence; but hold an opinion that it might prevent the spread; and if usually well ventilated, up-stairs bed-rooms would mitigate the disease.
34. Has not.
35. Have no positive evidence.
- 36, 38. No.
40. Cannot say.
41. Believe that high "social position" predisposes to the disease; also, that patients in such families usually have it in a more dangerous form.
42. Have not observed.
43. As far as personal observation,—think that females are more liable, and are more likely to disseminate the disease than males.
44. 6 days.
45. About 2 weeks.
46. Have no facts.
47. Can give none.
48. Can report no facts.
49. In any of the stages after that of "incubation."
50. In the "desquamative."
51. No.
52. Those with high temperature, and full general eruption, and those with severe complication of the throat.
53. Believe the particles of the cuticle from process of desquamation.
54. Have no evidence. Believe the contagium enters the body as a specific poison by absorption, either through the lungs or through the skin.
57. 6 days.
58. About 9 days.
59. About 30 days.
60. About 10 days.
61. About the same.
62. High fever. Suppression of urine.
63. About 1 to 20.
64. Know of no cases of special importance.
65. Know no details of such cases.
66. I do not think I can add to the excellent pamphlet issued by the State Board of Health, entitled, "Restriction and Prevention of Scarlet Fever."

I have not had extended opportunities to observe this disease, as, in my vicinity, there have not been any wide-spread epidemics. Every year or two there are a number of cases usually extending to but few families, and often not to more than one family. Usually these cases can be traced to an origin; as, for example, some have been away visiting friends where the disease has been prevailing, or have received visits from friends, or children convalescing from the disease, who say they "supposed they were entirely well," or that they "supposed the disease was communicated only when in the stage of fever." I think, in some instances, the contagium was carried in clothing; but I have met with such cases only when the facts were too obscure to form any reliable basis to make reports.

Respectfully submitted,

Charlotte, Eaton Co., Mich., May 14, 1877.

G. B. ALLEN, M. D.

REPLIES BY G. W. TOPPING, M. D., OF DEWITT, MICH.

Secretary State Board of Health:

Have not kept a record of cases of scarlatina, but report, from memory aided by visiting list, concerning cases occurring in my practice from Spring of 1874 to date—May, 1877.*

1. About 1 year old.
2. None.
3. Two.
4. 35 years.
- 5, 6. 5 to 10 years of age.
7. About 5 per cent.
8. None.
10. March, Apr., Jan., Feb., Oct., and Sept., are the months in which all my cases have occurred. The frequency of cases in the several months was in the order in which the months have been named.
11. Answer implied in "10".
12. The damp and cold months furnish the most cases.
13. Nothing uniform.
14. No uniformity.
15. Great diversity of soil in different cases.
- 16, 17, 18. Nothing.
19. None.
20. Sore throats are common where scarlatina prevails; frequently all the adults of the family have it; but rarely have I observed a diphtheritic membrane in those cases, but often a tenacious, ropy exudation easily removed and soon replaced, often whitish and frothy when expectorated, exposing a red and swollen mucous membrane. The uvula, tonsils, and entire fauces somewhat swollen, frequently accompanied with a little fever, but no eruption on the skin.
21. Sometimes observed swelling of joints, but more of an œdematous than rheumatic character.
22. Nothing.
23. In a German family, 5 persons, including a nursing babe and its mother aged 35 years, all had scarlatina, well defined, some of the cases followed by albuminuria and dropsy. Within a week or 10 days after ceasing to visit the last of these cases of scarlatina, the father, who had escaped the scarlatina, and a daughter aged 13 who had had it, came down with measles, and in due time all those who had just recovered from scarlatina, had the measles, with all the symptoms well defined. The family of a relative living near by had a disease called by the eclectic physician in attendance at the time, scarlet fever; but as their symptoms were described to me, it is evident that it was measles that this relative's family had, and from them the measles was doubtless caught by the family who had both diseases in succession.
24. Nothing.
25. Albuminuria, dropsy, catarrh, otorrhœa, and abscesses are frequent sequelæ.
26. About one-half of my cases have been severe.
27. 107° in two cases; both terminated fatally.
28. In 11 cases out of 27 in my practice.
29. In ten twenty-sevenths of my cases.
30. In eight twenty-sevenths.

* The figures beginning paragraphs refer to questions in Circular 17, on pages 394-7 of this Report

31. In nine twenty-sevenths, viz.: suppurative adenitis, purulent otitis, ozaena.
33. None.
34. Yes, so far as the susceptible are concerned.
35. P. T., residing in the country, had two children who had, successively, scarlatina. Origin was unknown. The susceptible were excluded until desquamation was completed, and the disease did not spread from this house.
- P. B. had a boy taken with scarlet fever. He had been playing with a near neighbor's boy who had had scarlet fever 5 or 6 weeks before, and from whom he had been kept excluded until about a week prior to coming down with it, when the isolation was discontinued, under the impression that all danger of contagion had passed, the neighboring boy appearing entirely well, and desquamation having been completed for about 3 weeks. No disinfection of this neighbor's house had been made.
- This son of P. B. was kept entirely isolated from all susceptible persons; and, though he lived in a village with at least 6 occupied houses within 12 rods, no one took the disease from him, and it has spread no farther up to this time, now 40 days. Since the commencement of desquamation.
- No disinfection has been used except free ventilation.
- 36, 38. No.
40. None.
41. That scarlatina is no respecter of caste.
42. The citizen fares no better than the foreigner.
43. None.
44. 36 hours. A clear case.
46. No reliable facts.
49. From the initial fever until desquamation is completed.
50. During the eruption.
51. Only the impressions derived from general experience.
53. An infectious miasm.
54. No especial evidence. Think it enters through the buccal and respiratory mucous membrane most frequently.
55. I have only an opinion that it acts as a ferment, or a sort of catalytic action.
56. About a week.
- 57, 58. 10 days.
59. 14 days.
60. 18 or 20 days.
61. Generally death occurs in the first five days, or in the third week from sequelæ.
62. Asthenia, asphyxia, and coma.
63. Six twenty-sevenths.
64. I think a person may have a sore throat produced by scarlet fever miasm, without having any eruption on the skin, and that a full-fledged scarlatina may result therefrom in a susceptible person. I have an impression that I have seen several such instances; but not having any notes of them, I cannot give data.
65. I have seen several cases where no contagion could be traced; but I presume they arose as suggested in "64."

DeWitt, Clinton Co., Mich., May 16, 1877.

G. W. TOPPING.

REPLIES BY C. V. BEEBE, M. D., OF HOWELL, MICH.

Secretary State Board of Health:

DEAR SIR:—I shall be obliged to answer the questions in Circular No. 17 from my general observations, and not with any special regard to this place; as I have just located in Howell.*

1. About 3 years, I think.
- 2, 3. None.
4. About 14 years old.
5. From 3 to 5 years old.
6. In earliest years of childhood.
7. Cannot say for this locality.
8. Limited, or in fact not any.
10. Increases prevalence and intensity.
11. Humid air increases its prevalence.
12. Changes from heat to cold favor it.
13. Cases where ventilation was poor more severe.
15. Larger number of cases and more severe near low land.
19. Poorer classes and unhealthy persons more susceptible to its influence.

20. *Have seen cases that I would have diagnosed diphtheria only for the eruption.
23. May appear in form of hybrid of measles and scarlatina.
26. More severe than mild, having been through two epidemics.
27. Did not record temperature.
28. Don't know.
29. The greater.
30. Should say one-twentieth.
31. Cannot say.
32. Should say yes; no personal observation.
33. None.
34. No.
35. None.
- 36, 38. No.
40. I think that the imperfect ventilation and foul air generated by congregating so many in one room for so long a time, and the changes from this to cold air, with carelessness about dress, favor the disease.
41. Lower grades of society more liable.
42. None.
44. I cannot say.
45. I cannot say; think about 10 days.
46. I do not think of anything definite, but believe that the disease is often communicated in this manner.
49. As soon as the fever is established.
50. When fever is at its height, and sore throat.
51. No; but I suppose when the sore throat is entirely well.
52. Gravior and epidemic cases.
53. Breath and stools.
54. By absorption through the mucous membrane.
55. No; but I think that the poison having entered the system acts directly upon the nerve centers, thereby lowering the vital forces and changing the blood.
56. From 5th to 7th day.
57. I cannot say.
58. About 2 weeks.
59. Three weeks.
60. From 10 to 14 days.
61. Two to 4 weeks.
62. Great prostration and feeble pulse.
63. About 3 per cent.
66. Close attention to diet and hygienic measures, free use of disinfectants, and ventilation.

Very respectfully yours.

Howell, Livingston Co., Mich., May 14, 1877.

C. V. BEEBE, M. D.

REPLIES BY O. MARSHALL, M. D., OF NORTH LANSING, MICH.

Secretary State Board of Health :

DEAR SIR:—Cases of scarlet fever have occurred in this city or its vicinity every year in the past ten. A report of the epidemic which occurred here in 1875-6 was given last year.† The following replies to Circular No. 17, "Relative to Scarlet Fever," are based upon the records of attendance of over two hundred and fifty cases of the disease.*

1. Two weeks.
2. None.
3. During the epidemic there were 10.
4. 47 years.
5. From 3 to 12 years.
6. From 1 to 7 years.
7. Not to exceed 40 per cent.
8. During the epidemic 5 persons had scarlet fever who were thought to have had it before.
9. 2 and 3 years.
10. I have seen much the larger number of cases in the Spring and Fall of the year.

*The figures beginning paragraphs refer to questions in Circular 17, on pages 394-7 of this Report.
 †See pages 43-52 of Fourth Annual Report of State Board of Health—for 1876.—H. B. B., *Sec'y.*

11. I believe that damp air near the freezing point is the most favorable condition for the development of the cause of scarlet fever; and that foggy weather is unfavorable for cases sick with the disease.

12. The better ventilation of houses in hot weather, from open windows and doors, and the lighter clothing and bed-covering required, have a favorable influence in preventing the concentration of the cause.

13. In well-ventilated houses more persons escape contagion, and milder cases occur, than in those which are small and poorly ventilated, and especially is this so when many persons are living together in the same rooms.

14. All causes which produce dampness and impurity develop the disease with greater certainty, whether in cellars, cesspools, ditches, or swamps.

15. The soil in this locality is generally clay. I have never attributed the disease to the soil, except that clay soil retains moisture longer, and consequently the houses over such soil are more liable to be damp.

16. Four cases of scarlet fever occurred near a slaughter-house in the 5th Ward several years ago, when there were no other cases of the disease in the city. At the time of the epidemic the slaughter-houses were all removed from the city limits.

17, 18. None that I know of.

19. Debilitated condition of the body from disease, occupation, or fatigue, mental or physical, increases the danger of contracting scarlet fever.

20. Have seen many cases of scarlet fever who had secondary diphtheria. This complication increases the danger in the case, or marks an unfavorable change in the disease.

21. I have seen the joints swell and inflame in scarlet fever patients, but did not consider the cause of the complication identical with rheumatism.

22. Thirteen cases of typhoid fever occurred during the year preceding the scarlet fever epidemic. In the immediate neighborhood of these cases, scarlet fever showed its greatest malignancy.

23. Nothing worthy of note.

24. Whooping-cough followed the epidemic of 1875-6.

26. During the epidemic more than half the cases were severe; in other years not more than one-fifth.

27. 108°, Fahrenheit. Died.

28. At least 50 per cent are attended with complications, although in many cases these may be slight. In answering this question much depends upon what symptoms are considered as belonging to the disease, and what are not.

29. I did not examine the urine in cases which were doing well, consequently I cannot give the proportion, or even approximate to it.

30. Not more than ten per cent of the cases have shown well-marked symptoms of dropsy. Much depends upon the management of the cases, after they have passed the eruptive stage of the disease, whether this complication appears or not. Improper food and overloading of the stomach, I believe, are more often the cause of dropsy in these cases than is exposure to cold. Exposure to cold and improper diet are the cause of more deaths in scarlet fever than occur from the fever itself.

31. Refer you to answer given to "28."

32. Had no experience with such cases.

33. During the epidemic there were eleven families who lived and did their cooking on the second floor over stores. In eight of these families there were twenty-five persons who had the disease. In these eight families no person under fifteen years of age escaped an attack. In the other three families there were but three persons under fifteen years of age. One of these had had the disease before, one was born during the epidemic, and the third was a black child.

34. Yes.

35. Those persons who kept away from the disease, and avoided every means of communicating it, escaped in nearly every instance. There were many such instances during the epidemic.

36, 38. No.

40. Many persons congregated together in small rooms, many hours in the day, without proper ventilation, contaminate the air with the poisonous gases from their bodies; consequently this favors the development of the disease.

41. Those who observe the laws of health, whatever their social position, are less liable to contract scarlet fever than those who do not; although they are sometimes obliged to suffer because of the uncleanness of their neighbors.

42. More persons of foreign descent have had the disease than of native.

43. More females than males have had the disease. More females than males have died from scarlet fever.

44.* Two days.

45. Where I was certain, fourteen days. I attended a family of five children who had scarlet fever; fourteen days from the commencement of the disease in the first child, two more were taken sick; in fourteen days after these two, the remaining children were attacked, making twenty-eight days between the first and last cases.

46, 47. Cases given in report last year.†

48. I attended a child last Fall who had the disease. Milk was obtained for the family from a neighbor's where there had previously been a case of scarlet fever. There was no communication between the families, the milk being left outside the house.

49. All stages, from the beginning until the completion of desquamation.

50. At or near the completion of the eruptive stage.

51. Nothing reliable.

52. The more malignant the case the greater the contagiousness.

53. Those conveyed from the lungs and throat in respiration.

54. By being brought in contact with the air passages (lungs, mouth, and throat) by inhalation; possibly in the food and drink, in some cases.

55. I have no evidence, but I believe that it acts as a ferment; that the stage of incubation is the time it takes to affect the whole blood, when a sort of effervescence takes place and the eruption appears; that the eruption continues until the subsidence of effervescence; that the severity of the case depends upon the condition of the body and the surrounding circumstances; and that the changes may be so sudden and so great that the body may be overwhelmed in the first changes which take place.

56. In severe cases, before the disappearance of the eruption on all parts of the body; in mild cases, from 5 to 10 days after the disappearance of the eruption.

57. In one instance, 5 weeks.

58. About 4 weeks.

59. Have seen cases where there were signs of desquamation after three months, and others where the skin ever after had a roughened appearance.

60. 30 days; although the fever usually disappears in from 3 to 8 days.

61. 11 days. Three-fifths die before the eighth day.

62. Exhaustion, asphyxia, collapse, coma, convulsions, named in order of frequency.

63. In the epidemic here, 1 in $6\frac{2}{3}$. In my whole experience, about 1 in 12.

64. Cases given in report last year.†

65. I have always found a cause to prove contagiousness which was satisfactory to me, if not to others.

66. In the epidemic, belladonna as a preventive, was thoroughly tried. Some of the worst cases followed its use after taking it a number of days before the attack of the disease. As a preventive, it was a failure in this epidemic.

My attention was called to the use of sulphate of quinine in antiperiodic doses as a preventive medicine. Noticing that those persons who had been taking quinine either had the disease in a mild form or escaped it entirely, I was led to give it a thorough trial; the result has been that in many families where the quinine was used, a single member in each (the one attacked before its use) had scarlet fever. In a few families more than one person had the disease after taking quinine, but always in a milder form and without complications. Of the many instances where quinine was tried, the best test was in the family of J. Risley, west of the Odd Fellows' Institute, near the city, last Fall. A sudden death from accident brought together in one small house two families with 12 children under 16 years of age. As the house was undergoing repairs at the time, these two families all slept in two small, adjoining rooms. While together in this manner, one of the children was taken sick with a severe attack of scarlet fever. All of the children were exposed to contagion for several days under the most favorable conditions for them to contract the disease. They were all placed upon quinine in antiperiodic doses,—all except the first one escaped the disease.

North Lansing, Ingham Co., Aug. 2, 1877.

O. MARSHALL.

* The figures beginning paragraphs refer to questions in Circular 17, on pages 394-7 of this Report.
† [See Fourth Annual Report of this Board, pages 43-52.—H. B. B., Sec'y.]

REPORT OF AN EPIDEMIC OF SCARLET FEVER AT OTISVILLE, GENESEE COUNTY, AND VICINITY, BY A. W. NICHOLSON, M. D.

Secretary State Board of Health:

SIR:—A reply to your favor requesting me to give you certain particulars relative to the recent epidemic of scarlet fever in this locality is herewith respectfully submitted to you.

At the time of the appearance of the case from which the commencement of the epidemic of scarlet fever here may be dated, the nearest case reported was fifteen miles distant. Since that time a subsidence of the disease would be followed by new series of cases, or by isolated ones until almost the present date.

The origin of many cases may clearly be traced to contagious influences originating with the first, though interruptions in the epidemic render it impossible accurately to trace some succeeding appearances to the same. Notwithstanding some of the cases confined within the boundaries of this epidemic are supposed to have had a foreign origin, no cases were prevalent until after the appearance of that of December 6, 1875.

From that time the disease, prevailing most through the following months of February and March, extended itself to all the contiguous townships, and, including those cases where medical attendance was supposed not to be required, the number attacked will approach sixty.

The disease assumed a mild form in most instances, though occasionally its most malignant characters were presented. The temperature of the body varied from 103° to 106° F. In some instances, severe anginous symptoms appeared with an eruption so imperceptible they might have been mistaken for those of idiopathic diphtheria, had not typical cases of scarlet fever been present in the same family. The number of deaths reported was five. In three of these the most unsanitary surroundings were present. The death of one case occurred in a garret of an ill-ventilated cabin, although three other mild cases were in the same habitation. The death of another occurred in a similarly constructed house, where the light of the sun was as entirely excluded as the pure air. In the last place, two surviving cases suffered a prolonged illness.

The death of the third happened in a small room occupied by a family of six, as a general living and sleeping apartment, three days after attack, with no medical attendance until within a few hours previous to death. Two other children were seriously ill at the same time in same room, one case resulting in deafness, the other in prolonged rheumatic trouble. At this place the water was poor. The death in the fourth case cannot readily be ascribed to any unsanitary conditions. The fifth was a case of pregnancy, attacked a day previous to confinement and followed by peritonitis.

Although the disease was manifested in a mild form in many instances where hygienic measures were little regarded, I know of but two instances in which a malignancy was exhibited where they were regarded.

The meteorological observations at the time the disease was most prevalent here would no doubt nearly correspond with those made at Lansing. The Winter was generally mild.

The first case was a druggist, twenty years of age, who was residing in Flint at the time of the attack. The contraction of the disease was attributed to his having waited upon a girl, at the store, who was known to be living at a house where there were several cases of scarlet fever. The nature of his illness was not discovered until his arrival at this place, two days after the attack. Every means was taken, by isolation of patient and by disinfection, to prevent the spreading of the disease. The case proved to be one of scarlatina maligna, owing, no doubt, to his exertions and exposure on the two days succeeding the attack. About three weeks subsequently to the appearance of this case, the second occurred, in the child of the woman who did the washing at the house where the first case was confined, notwithstanding she took every precaution to prevent contagion on returning to her family. The third case was that of a man, twenty-five years of age, who, five days previous to his attack, was at the house of the first case. To no other cause could the attack be attributed. Three others subsequently came down with the disease at the house of the third case. All of these, excepting the first, were of a mild form.

Before the process of desquamation was completed in the third case, he went to an adjoining town where there was no scarlet fever. Here two boys were exposed to him, by riding in the same vehicle, and in about seven days after were simultaneously attacked with the disease. The appearance of these cases was soon followed by that of others, and by one death. Another member of this family,—where one had been

the cause of other attacks and the death of one individual,—who had had a mild attack, was removed to a town fourteen miles distant, which removal was followed by dropsical sequelæ in the partially recovered patient, and fresh cases of scarlet fever in the family of the friend to which she had been taken.

Another among the first to be attacked was one where the attack was succeeded by parturition and death. Her place of residence was one village square distant from that of the first case, with an open field intervening. A strong south wind was blowing for several days previous to the attack, directly from the house of the latter to the former. It seems improbable that the disease could have been communicated in any other manner than by the medium of the atmosphere. Three other members of this household came down with the fever, about the same time.

Nearly all the cases in the village of Otisville were limited to one square. As soon as the second case made its appearance, all schools were temporarily closed, and no cases were communicated by scholars at school in that district.

In the month of February, a number of scholars at a school in an adjoining school district were sufficiently ill to be confined at their homes for a few days with a fever followed by an eruption, to all appearances identical with that of scarlet fever. No scarlet fever manifested itself in that district subsequently, with the exception of one family, in the month of July, with the death of one of its members. This family consisted of father and mother with three children, all of whom, in the preceding February, were sick with the fever and rash that made its appearance then. The three children only were attacked in July.

In the month of February, again, the scarlet fever broke out in a school two miles distant from the last mentioned, with no very severe cases. At this time an attendant upon one of them visited a school entirely isolated and six miles distant from the latter, or from any case of scarlet fever, remaining with the school some time. About a week thereafter a number in that school simultaneously were attacked with scarlet fever. Other cases followed, aggregating, in all, about fifteen. Very few cases have occurred since the last of March, and most of these mild in type; and, although the origin of some may be obscure, that of many may be traced to contagion, or to most enigmatical coincidences. Most of these cases came under my observation at the time of their occurrence, and the statements may be considered reliable.

During the epidemic the following deductions were made; to wit, that the poisonous element of scarlet fever is transmitted by direct contact, by the intervening atmosphere as a medium, or by fomites, occasioning reproduction of the disease in certain persons susceptible of being affected by the poison, usually those who have never before been exposed to the contagium; that, by long exposure to it, the same poison will occasion some, or all, of the symptoms of scarlet fever to appear in persons who have previously gone through with a course of the disease; that the usual consequences of exposure to the poison of scarlet fever are much mollified by good sanitary conditions.

I have omitted statistics in this report, as any statistical conclusions required pertaining to this epidemic may be derived from my annual report for the year ending December 31, 1876.*

Very respectfully yours.

Otisville, Mich., February, 1877.

A. W. NICHOLSON, M. D.

REPLIES BY A. W. NICHOLSON, M. D., OF OTISVILLE, MICH.

Secretary of State Board of Health :

In reply to Circular No. 17, I respectfully submit the following:†

1. 3 weeks.
2. None.
3. 2 cases.
4. 28.
5. Should consider ages, inclusive, from 3 to 10.
6. My own observation would place it below 10 years.
7. Inquiry leads me to estimate it at 50 per cent.
8. Of probable second attacks, 4 cases.
9. Of 3 cases, 1 year; of 1 case, 10 years.
10. Observed mildest cases in Summer months, severest in Spring.
11. Nothing positive.

* [In Dr. Nicholson's annual report he gives details of 22 cases of scarlet fever, occurring from Jan. 3 to July 8, 1876, of which 3 died and 19 recovered. He also mentions 1 other death occurring among about 20 cases not reported to him as Deputy Clerk of the board of health of the township of Forest.—H. B. B., Sec'y.]

† The figures beginning paragraphs refer to questions in Circular 17, on pages 394-7 of this Report.

12. Nothing but that relative to season.
 13. 75 per cent of deaths occurred in ill-ventilated houses. Proper ventilation seemed to mitigate the severity of many cases.
 14. Nothing.
 15. Soil in vicinity of majority of cases, sandy loam.
 - 16, 17, 18. Nothing.
 19. One death occurred of a child but a short time previously recovered from cerebro-spinal meningitis. No other case seems to bear any relationship to this question.
 20. Observed two cases of diphtheria where scarlatina was most prevalent, when, for 3 years previous, no diphtheria had appeared.
 21. Rheumatism as a sequela frequently occurred.
 - 22, 23, 24, 25. None.
 26. 75 per cent mild.
 27. 106°. Recovery. Age of case, 20 years.
 28. My observations would place it at about 20 per cent.
 29. I could not state positively, but I should think, a large per cent.
 - 30, 31. I should think, 10 per cent,
 32. I could not state.
 33. No evidence.
 34. It has not been *complete* in any case.
 35. None.
 36. It has not.
 - 40, 41, 42. No observations.
 43. No marked observations.
 44. One day.
 45. About 21 days.
 46. Replied to in report of epidemic in this locality (now on file in office of State Board of Health).
 47. Am unable to.
 48. I cannot.
 49. I know of no stage of immunity from contagion.
 50. During the highest stage of efflorescence, or, at the commencement of the stage of desquamation.
 51. No evidence.
 52. Should consider those of scarlatina anginosa.
 53. Primarily, excrementitious exhalations from the surface of the body.
 54. No evidence. I am of the opinion that contagium enters the body by inhalations into the lungs, as the most frequent manner, and next, by cutaneous absorption.
 55. I am unable to reply.
 56. Sixth or seventh day.
 - 57, 58, 59. No reliable observations.
 60. Between 2 and 3 weeks.
 61. Of 5 fatal cases coming under my observation, the average duration was about 7 days.
 62. Anginose and cerebral.
 63. About 10 per cent.
 64. See report previously referred to.
 65. I have seen no such cases.
 66. Strict sanitary measures, absent in many instances during the recent epidemic in this locality, would mitigate the severity of the disease, and no doubt often prevent its occurrence.
- Very respectfully,
A. W. NICHOLSON.
- Otisville, Genesee Co., Mich., May 4, 1877.*

REPLIES BY D. C. HOLLEY, M. D., OF VERNON, MICH.

To the Secretary of the State Board of Health:

- 1 I have seen, perhaps, half a dozen nurslings at the breast have scarlet fever, their ages varying from 3 months (the youngest) to 12 months.
2. None.
3. Perhaps 6 cases.
4. 15 years.
5. I should say from 1 to 15 years.
6. Other things being equal, the younger the greater the danger.
7. I cannot give proportion, but the disease has never been wide-spread as an epidemic.

8.* I have never observed any.

10. It is more apt to prevail in cold weather.

11, 12. Nothing.

13. I have always insisted upon plenty of fresh air in all cases. Actually nothing.

14, 15. Observations have been too limited.

16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26. Nothing worthy of note.

27. Temperature in fatal cases has reached 107° and 108°.

28, 29. No observation.

29, 30. Cannot give exact proportions, but should think 1 case in 6 has exhibited symptoms of dropsy and albuminuria.

31. Observations are too limited to note other sequelæ.

32, 33. No note.

34. The first epidemic of scarlatina in this section of the country commenced in Dec., 1867, and continued for about three months. We endeavored from the beginning to impress upon the community the necessity of complete isolation, in all cases, but were able to carry it out with only partial success, owing to the ignorance both of the people and of many physicians, the latter mostly irregular practitioners, even denying the contagiousness of the disease. Even funerals of those dying of the disease were public, the remains taken to the churches, and, in some instances, the coffins opened for the gaze of the public; but this was soon discontinued.

During this visitation of the disease, schools were not closed, nor was any particular care taken to keep children liable to the disease, at home away from schools and churches, or where children usually congregate, but all went and came as they pleased. As a natural consequence, the disease became wide-spread, and many cases and many deaths were the result of this want of sanitary police.

In January, 1876, a little girl, aged about 12 years, daughter of A. McK., of this village, went on a visit to friends living in Corunna. Whilst there she was exposed to the infection of scarlatina. When the period for incubation in her case was nearly completed, she returned home on the cars. As she left the train, the first person she met, with whom she stopped and held conversation, was a little son of Dr. Leeds, then of this place, aged 10 years. After a few moments of conversation she went home. Three days subsequently to this occurrence the little boy came down with scarlet fever. The next day Florence McK., the girl mentioned above, came home from school sick with the same disease. Hers proved a severe anginose case. Within a week a little brother of this girl, aged 8 years, sickened and died within 72 hours, with malignant scarlatina. In this case there was scarcely any well-defined eruption, but from the commencement of illness the whole system of organic life (ganglionic) seemed paralyzed. Another child aged 3 years, sickened with the same variety, malignant, and died in convulsions within 48 hours after attack; both were buried in one grave. The community was now sufficiently aroused and excited to make it easy work to institute sanitary precautions to prevent the further spread of the disease. The public school was immediately closed, also all the Sabbath schools in the several churches in the place. Parents were advised to keep all children at home who were liable to be infected by the fever. These measures were faithfully carried out in all their details. The result was three other cases infected before the closure of public schools occurred. This was the extent of the disease. Comment is, of course, unnecessary.

36, 37, 38, 39. No trial.

40, 41, 42, 43. No observation.

44. 2 or 3 days.

45. Can give no particular facts.

46. During the epidemic of 1867-8, my own family, consisting of 4 children, were kept at home, isolated so far as possible; but being myself in constant attendance upon those sick with scarlet fever, though quite careful as far as possible about my clothing, I conveyed by means of fomites about my clothing or person in some way, the disease into my family. A young and favorite daughter aged about 5 years, who was always the first to run to me and greet my return home, took the disease first and had it severely; then my oldest son, aged 15, came down with it; then the oldest daughter, aged 13 years; finally an infant at the breast, nine months old, sickened, and, after about a week's illness, died. To my own mind, the fact that I conveyed the disease into my family while engaged in the discharge of professional duty, amounts to a certainty.

47, 48. Have no positive facts.

49, 50. Though infections at any stage of the disease, facts to my mind point to

* The figures beginning paragraphs refer to questions in Circular 17, on pages 394-7 of this Report.

the period of desquamation as being altogether the one of greatest liability of conveying the fever.

- 51, 52. Negative.
53. The dry epithelium thrown off by the skin during desquamation.
54. Probably through the respiratory organs.
55. No theory.
56. From the 7th to the 10th day; sometimes later.
57. Experience limited.
- 58, 59, 60, 61. I cannot give details.
62. Adynamia.
63. I cannot give statistics.
- 64, 65. Some cases at first supposed to be spontaneous after more careful investigation proved to have come from previous infection.

66. *Complete isolation*, and subsequent thorough disinfection foremost and last. In an adjoining township there has occurred a limited epidemic confined almost entirely to one school district. The cases did not occur in my practice; I have learned, however, of several deaths occurring which might have been prevented had the instructions laid down in pamphlet on scarlatina prepared by State Board of Health, been observed.

It occurs to me that three copies of the pamphlet referred to should be sent to every school district in the State. One copy should be nailed up in the portico of every school house, as a bulletin of facts. Thus every parent would soon be in possession of truth which, in the aggregate, would probably save annually many lives now lost.

Truly yours,

Vernon, Shiawassee Co., Mich.

D. C. HOLLEY, M. D.

BAY AND EASTERN DIVISION OF THE STATE.*

REPLIES BY W. H. BURR, M. D., OF BAY CITY, MICH.

Secretary State Board of Health:

DEAR SIR:—As my experience in scarlet fever has been rather limited, and as I have not kept records of cases, I cannot give a very complete answer to the questions contained in your circular. The disease never prevailed here as an epidemic to any considerable extent, and it is comparatively rare. I can give intelligent replies to but very few of your questions, but herewith append answers to such.*

1. One year and a half.
2. Never.
3. One.
4. 21 years.
8. Not at all.
10. Most prevalent in cold weather.
- 11 to 25. No observations.
26. Perhaps equally divided.
34. No.
35. None.
38. No.
50. Desquamation.
51. No.
60. About 2 weeks.
63. Have had no fatal cases.

Yours, etc.,

Bay City, Bay Co., Mich., May 11, 1877.

W. H. BURR.

REPLIES BY WILLIAM R. MARSH, M. D., OF BAY CITY, MICH.

Secretary State Board of Health:

DEAR SIR:—Your circular, No. 17, is before me. I will reply to some of the questions.

- 1, 2, 3. I never saw a nursing babe or a child under 14 months have the scarlet fever.
4. I have been in domestic practice for 27 years in Michigan, and 5 years in Kentucky, and I have not met a case in my own observation above 14 years of age.
5. From 3 to about 7 years.

* For counties included in each Division, see Exhibit 1, page 171.

- 6.* About 3 to 5 years.
 8. I have seen none.
 20. Similar soil and climatic influences favor both.
 23. May be answered by "20."
 26. Average mild cases. I have never met any serious general epidemic.
 41. I think that children of those families that are well cared for are as prone as are the poor to contract the disease.
 51. I have not, and I can give no evidence when it begins, but what can be as readily assigned to general causes.
 56. About the 7th day.
 58. From 14 to 16 days.
 62. Glandular, about the throat and bronchial organs.
 63. One Spring, out of 40 cases, one only died; and yet, considering other seasons, I would say, 1 in 15.
 I am sorry not to be able to see the contagiousness of scarlet fever, as almost the unanimous opinion prevails; but, notwithstanding, on account of the opinion of other medical men, I act with my patients with the same caution as though I felt that it was contagious.

Very respectfully,

Bay City, Bay County, Mich., Oct. 23, 1877.

WILLIAM R. MARSH.

REPLIES BY NELSON H. CLAFLIN, M. D., OF EAST SAGINAW, MICH.

Secretary State Board of Health:

DEAR SIR:—The following replies to circular 17 are the best I can give, with the observations I have recorded, and so far as I can remember.*

1. $1\frac{1}{2}$ years.
- 2, 3. None.
4. 15 years.
5. 3 to 6 years.
6. 3 to 5 years.
7. $\frac{1}{2}$, I think.
8. 2 or 3 only.
9. 5 to 11 years.
10. Have seen most in cold weather.
- 11, 12. Nothing.
13. Imperfect ventilation increases its virulence; thorough ventilation decreases it.
14. No experience in regard to either.
15. Nothing.
16. Never saw any near a slaughter-house.
- 17, 18. Nothing.
19. A sickly child, or one weak from disease, is more likely to take it; occupation has little influence.
- 20, 21, 22, 23, 24, 25. Have observed none.
26. 20 to 1.
27. 108°. Died.
28. About 1 in 10.
29. 1 in 20.
30. 1 in 40.
31. 1 in 40.
32. I think not, except that the more the system is prostrated the more susceptible it is to disease generally.
33. None.
34. No.
35. None.
- 36, 38. No.
40. None.
41. No difference, except by better ventilation, etc.; those well situated are less liable.
42. No difference.
43. None.
44. 3 days.
45. About 10 days.
46. It is, by clothing, especially if one holds a child sick with the fever, then puts on a shawl, water-proof, over-coat, or similar garment. One may thus convey it to

* The figures beginning paragraphs refer to questions in Circular 17, on pages 394-7 of this Report.

another child after several hours, even if he has in the meantime walked several blocks in the open air.

47. Can give none.
48. None observed.
49. From the beginning of the fever as long as desquamation continues.
50. When there is most fever and sore throat.
51. When desquamation has ceased.
52. Severe, especially those with sore throat.
53. The breath.
54. I believe by *inhalation*.
55. No.
56. 8 to 10 days.
57. 15 to 20 days.
58. About 20 days.
59. About 30 days.
60. 10 days.
61. 8 days.
62. Inflammation of the throat.
63. 1 to 30.
64. I have none.
65. I know of none.
66. Isolate them and see that the room is thoroughly ventilated.

Yours truly,

East Saginaw, Saginaw Co., Mich., Sept. 6, 1877. NELSON H. CLAFLIN, M. D.

REPLIES BY A. NASH, M. D., OF LAPEER, MICH.

Answers to questions in Circular No. 17.

1. Two months.
2. None.
3. 6.
4. 30 years.
5. From 2 to 12 years; average age, 5 years.
6. 2 or 3 years.
7. One-half.
8. None that I have seen myself.
10. Prevails much more in Winter months.
11. It is more widely disseminated when the atmosphere is humid, and is more severe particularly in the Winter.
12. Unseasonable weather aggravates the disease.
13. No observation to note.
14. Dwellings occupying low situations, and those secured from prevailing winds, particularly favor the propagation of the disease.
15. No observation.
16. Nothing.
- 17, 18. Not any.
19. Healthy children are quite as susceptible to its invasion as the weakly.
20. It very frequently prevails in the same locality at the same time with diphtheria.
21. Not any.
22. No connection between them.
23. They seldom go hand in hand.
24. Not any.
25. Parturients are likely to be unfavorably affected by scarlet fever in their immediate vicinity.
26. 8 to 5.
27. 106°; fatal.
28. 1 in 4.
29. 1 in 6.
30. 1 in 10.
31. 1 in 3.
32. I think they are not.
33. A practice in the rural districts can give no data upon this, as nearly everybody occupies the ground floor. I am of the opinion, however, that an up-stairs window would give almost complete immunity to the disease.
34. No.

35.* None. I am of the opinion that it is not wholly propagated by contagion, but that it suddenly appears simultaneously in various localities, as if by the subtle agency of some poison pervading the atmosphere.

36, 38. No.

40. It very much increases liability to contract the disease. The pent-up atmosphere of many school rooms is more thoroughly impregnated with the poison than is the air of ordinary dwellings.

41. High social position offers no immunity.

42, 43. None.

44, 45. I cannot say.

46. I think I have very conclusive evidence of the disease being carried in a pocket-handkerchief a distance of one mile, and communicated to an infant who had not been out of the house for some weeks. A little girl on her way home from school called at a house and got a handkerchief she had forgotten some days before, and carried it home. The baby came down with scarlatina in 5 days, had lung complications, and died within 2 weeks. The girl escaped the disease.

47. In one house I think the poison remained 2 years; at least this was the only known source of contagion. In another it remained active for 6 months.

48. None.

49. At any stage from the commencement of the fever till desquamation is perfected.

50. During the continuance of the eruption.

51. No.

52. Those in which the mucous membrane is most extensively involved.

53. The respired air and the cutaneous exhalations.

54. By inspiration only.

55 I believe it is a blood poison; the fluids of the body are all impregnated with it.

56. About 6 days.

57, 58. 10 days.

59. 15 to 20 days.

60. 14 days.

61. 3 to 4 weeks.

62. Uremic poisoning.

63. 1 in 60 or 70.

64. I have no reliable fact bearing upon this.

65. This section of country was entirely free from the disease for at least a year, when three cases appeared upon the same day in families living 4 and 6 miles apart, and in each family infants not in the habit of being out at all, were the first attacked. No other cases occurred in these families, though in each there were other children who had never had the disease. Other cases sprang up in several localities soon after this, when there was no known source of contagion. I saw a well-marked case of scarlet fever in a small child a few years ago, in which the house was standing a little over a mile from any neighbor. No child or stranger had been there to their knowledge for many weeks previous. I think I am safe in saying there was not a case of the disease within 6 or 7 miles of this house, and no cases followed this one anywhere within the limits of my practice. I am decidedly of the opinion that it has a spontaneous origin at times; though its usual mode of propagation is through contagion. I do not limit this word to actual contact with infected bodies, clothing or other substances, but infection through atmospheric poisons, receiving it through the impure air.

Respectfully,

Lapeer, Lapeer Co., Mich., May, 1877.

A. NASH.

REPLIES BY A. M. OLDFIELD, M. D., OF LEXINGTON, MICH.

I have seen but very little scarlet fever.*

46. To this question of communicability of this disease by clothing, would say: I communicated it to my little girl from my clothing, and that after having thoroughly aired my clothing, and not worn it for 6 weeks after attending a case.

Lexington, Sanilac Co., Mich., Aug. 24, 1877.

A. M. OLDFIELD, M. D.

REPLIES BY C. M. STOCKWELL, M. D., OF PORT HURON, MICH.

Response to Circular No. 17, from the Board of Health of Michigan.*

1. 4 days.

2. One only, that I positively remember.

* The figures beginning paragraphs refer to questions in Circular 17, on pages 394-7 of this Report.

3. 10, perhaps.
4. 35 or 40.
5. 2 to 12.
6. Under 5.
7. Should think about 3 per cent.
8. 4 cases in 25 years. One case was attacked the third time; interval between first and second attacks, 2 years; between second third, 5 years.
9. Several years; one, 20; another, 10 or 15, besides the one before mentioned.
10. Cannot say; but have observed much greater frequency during the Spring months.
11. Cannot give certainty of observation, but have supposed it increased by humidity, both in severity and frequency.
12. Aggravated by cold, especially with humid atmosphere.
13. Very marked relief from good ventilation, and great aggravation from lack of the same.
14. Also, marked aggravation by proximity to damp cellars, cesspools, etc.
15. Greatly aggravated.
16. No observation.
19. Have detected nothing of significance in this particular.
20. There seems to be close analogy, both in appearance and results, as I have observed them.
- 21, 22. Nothing.
23. They seem to prevail together; seldom one appears without the other preceding or immediately succeeding.
24. Have observed no relation.
25. No other than before mentioned.
26. 7 per cent, approximately.
27. No observation.
28. 3 per cent.
29. 1 per cent.
30. 1 per cent.
31. 2 per cent.
32. Have no data upon which to found an opinion.
33. Nothing reliable.
34. Yes.
35. Favorable to such restriction, often preventing the disease.
- 36, 38. No.
- 41, 42, 43. Nothing.
44. 3 or 4 days, as supposed; but cannot rely fully upon the information received.
45. Have no data on which to base period of incubation.
46. Have no evidence of certain character.
47. One case terminated fatally in a house where two families resided; the one on the ground floor, the other up-stairs. The children of the up-stairs family were excluded from the other family, although their mother was almost constantly passing backward and forward, and escaped the disease. Some clothing of members of the family on the ground floor (I think of the child that died) was rolled up and left in an out-shed. One year afterward that clothing was removed, in the process of cleaning the shed, by a young man 20 years of age, who 12 days after suffered from a very severe attack of scarlet fever,—eruption, ulceration of throat, and desquamation, all indicating, unmistakably, the character of the disease.
- This was an isolated case; the disease was not propagated by it. No other cases occurred in the neighborhood for months before or after.
49. All stages.
50. Febrile stage.
51. No.
52. Severe.
53. All. I have been unable to detect any difference.
54. By inspiration.
55. As a ferment (bacteria), is my belief; positive evidence is wanting.
56. From 5 to 7 days; one or two cases, 2 weeks; think this was due to inoculation with cocoa butter.
57. 2 weeks.
58. 3 weeks, or from 21 to 25 days.
59. 5 weeks.
60. 4 weeks, including desquamation.
61. 5 to 8 days.

- 62.* Coma, with severe swelling of parotid glands.
 63. 2 per cent.
 64. I have nothing to offer.
 65. I have no records of such.
 66. Equable temperature, pure air in abundance, the use of carbolic acid spray, sustaining treatment, with innunction with cocoa butter (Ol. Theobromæ) combined with carbolic acid, if of malignant tendency.
Port Huron, St. Clair Co., Mich., April, 1877.

C. M. STOCKWELL.

REPLIES BY JOHN S. CAULKINS, M. D., OF THORNVILLE, MICH.

Answers to questions in Circular No. 17, relative to scarlet fever.*

1. Have seen abscesses about the neck in some cases of very young children, in families where the rest of the children have had the scarlet fever. I do not recollect to have seen the eruption on any child under the age of 12 months.
 2. None.
 3. Cannot recall the total number, but remember to have seen a few.
 4. 37.
 5. From the age of 5 to 15.
 6. This question is difficult to answer. It needs more extensive statistics than any that I am in possession of. I think, however, that no very young child has died with scarlet fever within my observation.
 7. Another difficult question; probably not more than 1 in 5.
 8, 9. Have never seen a second attack.
 10. The greater number of the epidemics of the disease that have come under my observation has been in warm weather. If this is generally so, it may connect itself with the fact that there is then a greater amount of travel and facility for transportation of the virus.
 11. Nothing.
 12, 13. Cold weather has an influence on the disease. Ventilation cannot be so thorough on account of it, and the poison accumulates. I think that I am not deceived in saying that I have observed that in cold weather the disease makes cleaner work with a family of children,—that there will be fewer instances where a part will escape, than in warm weather, when doors and windows can be left open, and the poison be blown out of the house.
 14. Nothing definite. There was a case (among my near neighbors) where a family had the disease, immediately after moving into a house, the cellar of which was in wretched condition, having a foot of water and a great quantity of wood in it, thrown there by previous occupants in order to keep above the surface of the water. The family consisted of the parents and 5 children, of whom none but the father escaped. The mother was the oldest case of the disease ever seen by me. Its source could not be traced, nor did it spread further. It should be remarked that the disease did not make its appearance till after the cellar was cleaned out. The family were strongly of the opinion that the stench from the decayed stuff, wood, vegetables, etc., was the cause of their sickness, which may be true in the sense that the unwholesome emanations from the cellar poisoned them and made them an easier prey to the invasion of the scarlatinous germ.
 15 to 20. Nothing.
 21. Have seen rheumatism occur as sequel to scarlet fever in a few cases.
 22 to 25. Nothing.
 26. The proportion is different in different epidemics, but, as a mean of all, the mild cases may be approximately stated at 50 per cent of the total.
 27. 105.5 in a case that recovered.
 28. No great proportion.
 29. Nearly all.
 30. 25 per cent.
 31. 25 per cent.
 32, 33. Have no evidence on these points.
 34. No, nor would it be easy to get it done; for the reason that the community are too little impressed with the danger of infection.
 35. None.
 36, 38. No. Disinfection after scarlet fever has not been practiced, and the suggestion meets with no favor among the laity.

* The figures beginning paragraphs refer to questions in Circular 17, on pages 394-7 of this Report.

39, 40, 41, 42, 43. No observations on these points.

44. 7 days.

45. 14 days.

46. Such facts are hard to get at; but in one instance the probability approximates to a certainty that the disease was communicated by letting the well child look at a wax doll which the sick one had with her, both being in the open air, not very near each other, and a person not attending on the sick child making the exchange. For an instance where the disease was communicated by clothing, see *Peninsular Medical Journal*, Sept., 1876.

47. Three years ago, in a certain school house, a girl was taken sick in school hours with scarlet fever, vomiting on the floor and breaking out before she left the house. This was immediately followed (but I forget in how many days) by the appearance of the disease in four different families, all of whom sent their children to that school, in three of the families the children being scholars; and in the fourth, being too young to go to school, the disease was brought home to them by an older child that did go to the school, and who had formerly had the scarlet fever. Since that time, the disease has made its appearance twice in the same district, at intervals of about eight months, and both times the first cases were children attending the school.

48. Have no such facts.

49. I believe at all stages.

50, 51, 52, 53. I cannot tell, having no facts on which to base an intelligent opinion.

54. I have no physical evidence, but have a theory as to the usual way in which the contagium enters the body to produce the fever. I believe that it is by the way of the alimentary canal and the lacteals. It is probable that the lungs and skin are effectually closed against its entrance, except in cases where there are abrasions of the epidermis and epithelium. Through such abraded places the poison would easily get into the blood.

55. My belief as to the manner in which the contagious principle acts to produce the disease is based on the postulate that the contagium is a living, organic ferment. The fever is the result of the proliferation of the fungus, and the consequent changes produced by it in the blood, analogous to those produced by other organic ferments in fermentable substances suitable for their nourishment; as, for instance, in sweetened water by the alcoholic ferment,—the cells of brewer's yeast. Among these changes so produced in fermentable substances, is especially to be noticed, as throwing light on the manner of sudden, early death, in scarlet fever, and other zymoses, the elimination of volatile and generally poisonous products, familiar instances of which are the escape of carbonic acid in yeast fermentation, hydrogen gas in acetous, and sulphydric acid in putrefactive fermentation. There is reason to think that scarlet fever is no exception to this general rule in all fermentations, and that some intensely poisonous gas is generated in the blood, that kills by its action on the nervous centres. It is my conjecture that this gas is carbonic oxide, and that the reaction by which it is formed is caused by the attack of the fungus on the molecule of carbonic acid to get air, and the consequent elimination of one equivalent of its oxygen: thus: $C O_2$ (carbonic acid)— $O=C O$ (carbonic oxide).

If the objection is raised, that this theory is uncalled for, because abundance of air is furnished at the lungs, it may be answered that there are infusoria known, to which pure oxygen or atmospheric air is fatal, and that which is true of the known may also be true of the unknown.

Carbonic oxide is an energetic poison, quickly destroying human life in the small proportion of 1 to 200 parts of respirable air, and it may yet be found that it is one of the most important elements in the "pestilence that walketh in darkness." A further objection may be brought against this hypothesis, that it is inconsistent with the fact that the scarlatinous poison retains its vitality for a considerable time, perhaps a year or more. How can this be, if oxygen is fatal to it, as it is to the vibrio?

The reply to this is, it is believed that the scarlet fever contagium is one of those fungi that propagate themselves by ripening their spores, and not merely by fission or budding. It is a general law in vegetation that the seed is capable of preservation much longer than the cells of the parent plant. The potato is a good illustration of this, the seed of the plant, which is in the balls, being capable of preservation for future use for years, while the tuber, which is merely a collection of buds, decays in a few months. So with every zymosis: if it is the cell of the ferment that is thrown into the atmosphere, the contagium is fugitive; if it is the ripened spore, the contagium is permanent. The researches of Koch show that the *bacillus anthracis*, the ferment that causes the rinderpest, in which the permanence of the contagium is remarkable, ripens its spores. It is highly probable that the permanence of the contagium of scarlet fever is to be explained in the same way.

56.* 8 or 10 days.

57. I have not observed.

58. 3 to 4 weeks.

59. I have not observed.

60. Reckoning to the time of complete defervescence, about two weeks.

61. 4 or 5 days.

62. Coma or convulsions.

63. It varies greatly in different epidemics; perhaps 1 to 10 would be the mean of all.

64. See answers to "46" and "47."

65. Cases of this disease are *apparently* spontaneous where the source of the poison and the means of its transportation are not known. Many such cases have come under my notice, that of the family mentioned in "14" being one. This appearance frequently vanishes before careful investigation, and the source and mode of infection become known; as in the following recent case: A child of three years of age sickened with scarlet fever on the 20th inst. and died the next day. It was the most rapidly fatal case of the disease that ever came under my notice, the child having been as well as ever at 2 P. M. of the 20th, and dead at 11 P. M. of the 21st. (Others have seen cases more quickly fatal than this. One such was seen by Dr. Blake, of Attica, last year, the child dying before morning, after having spent the whole previous day at school.) There was, so far as the parents knew, no suspicion as to the source of the infection; the child had been nowhere; no one had been at the house; it was apparently a spontaneous case. Inquiry afterwards made of an older brother of the deceased child disclosed the fact that, after leaving, on the 1st of April, the place (my own house) where he had resided all Winter, and before going home, he had visited friends, and passed the night in a house where there was scarlet fever. The distance that the poison was transported was 18 miles, and the time that it was preserved 7 weeks, deducting the period of incubation.

66. It is suggested that the germicide power of ozone should be tested in scarlet fever. It may be that there are other ways in which it may be efficacious besides liberating it in the sick-room in sufficient quantities to oxidize the spores of the ferment. It may be efficacious used in watery solution for a drink, and certainly would be for a wash, for I have found that in the proportion of one drachm to the ounce, ozonised water will keep a solution of sugar from fermenting for an indefinite length of time. I have kept such a solution nearly a year, with no sign of fermentation in it yet. If such a solution of ozone will kill the germs that drop in it from the atmosphere, it certainly will such as cling to the skin or clothing of the sick. Some of the turpentine dissolve ozone largely,—perhaps it might be efficaciously used with them as an unguent.

Two years ago one of your Board said, "Perhaps it may yet be found that ozone possesses in a high degree the properties of a germicide. If this should prove to be the case, its relation to the spread of the contagious and epidemic diseases may be of the greatest value." If through your initiatory action this should be proved true, the title of the Michigan Board of Health to rank among the permanent benefactors of mankind will be established.

Thornville, Lapeer Co., Mich., May 30, 1877.

JOHN S. CAULKINS, M. D.

SOUTH-WESTERN DIVISION OF THE STATE.†

REPLIES BY H. S. LAY, M. D., OF ALLEGAN, MICH.

1.* I think about 18 months.

2. In no case that I can remember.

3. I cannot recall any.

4. About 40 years.

5. Between 2 and 8 years.

6. Between 2 and 5 years.

7. Probably from 10 to 15 per cent.

8. Do not remember of but one well-marked case.

9. The interval in this case was a little less than 6 months.

10. Have not observed sufficiently to justify an opinion.

11. Humidity acts unfavorably I think.

* The figures beginning paragraphs refer to questions in Circular 17, on pages 394-7 of this Report.

† For counties included in each Division, see Exhibit 1, page 171.

12. Nothing.
13. Good ventilation is of utmost importance in mitigating and restricting the disease.
14. The location of dwellings, school-houses, etc., in close proximity to damp cellars, cesspools, ditches, and swamps increase the liability to, and the severity of, the disease.
15. I do not know.
16. More severe.
17. Have not noticed any.
18. In my opinion those who use freely or inordinately of swine's flesh are more subject to this disease, and usually have it in a much severer form. I formed my opinion from being acquainted with a large number of families that never use pork or lard, and that seem to suffer much less from the disease; although among those who do not eat pork, I have had more opportunity for observing the exemption from diphtheria than from scarlet fever. The immunity from the disease in the class referred to may, however, be owing in part to their being rather more hygienic in their general habits than most other people.
19. Could not say.
- 20-25. Have no clearly settled opinion.
26. 75 per cent.
27. 107° F.; result fatal.
28. 25 per cent, an approximation.
29. 4 per cent, an approximation.
30. 12 per cent, an approximation.
31. 8 per cent, an approximation.
32. Have not sufficient evidence upon which to form an opinion.
33. The weight of evidence is in favor of up-stairs rooms.
34. It has not.
35. No evidence from observation.
- 36, 38. No.
40. Do not know.
41. The disease is more common and fatal among the lower classes.
42. Nothing.
43. I think sex has no special influence.
44. 2 days.
45. 2 months.
46. Have no facts to report.
47. Do not know of any under my observation.
48. I know of none.
49. At any stage, if at all.
50. I do not know.
51. No.
52. The most malignant.
53. That from the skin and bowels.
54. I do not know.
55. Nothing positive.
56. In from 6 to 10 days.
57. 2 to 3 weeks.
58. I have not observed closely enough to state.
59. I do not know.
60. 10 to 14 days.
61. 2 to 7 days.
62. The throat symptoms.
63. 15 to 20 per cent.
65. A number of years ago, I had several cases that to all appearances were spontaneous; but so long a time has elapsed that I have forgotten the details, not having kept notes of the cases.
66. (1.) I would endeavor to secure the best general sanitary conditions possible. (2.) I would advise all those that are liable to contract the disease to abstain from eating swine's flesh, in all its forms, including lard. (3.) I would recommend that they be properly clad, having their extremities especially well protected by suitable clothing, so as to preserve a balanced circulation. (4.) Give them pure air in abundance and as much as possible out of doors. (5.) Sufficient bathing to secure perfect cleanliness.

Allegan, Allegan Co., Mich.

II. S. LAY, M. D.

REPLIES BY THOS. H. BRIGGS, M. D., OF MATTAWAN, MICH.

DEAR DOCTOR:—In relation to questions of Circular No. 17, I will try and answer a portion of them.*

1. 3 years.
- 2, 3. None.
4. 20 years.
5. 3 to 5 years.
6. 13 to 15 years.
7. 45 per cent.
8. 2 cases.
9. Both within 4 years.
10. Most in cold weather.
11. Dry atmosphere.
14. Do not believe it makes any impression on it.
16. No observations.
20. No relations.
26. 90 per cent.
27. No recorded observations.
28. Very seldom complicated.
30. 5 per cent.
31. 8 per cent.
46. Do not believe it is so conveyed.
56. Decline of the eruption.
58. 2 to 4 weeks.
60. 8 days.
61. 18 days.
62. Pyohæmia.
63. 5 per cent.

Mattawan, Van Buren Co., Mich., May 10, 1877.

Truly yours,
THOS. H. BRIGGS.

REPLIES BY MILTON CHASE, M. D., OF OTSEGO, MICH.

Secretary of State Board of Health:

SIR:—The following is my reply to Circular No. 17, relative to scarlet fever:*

1. 2 years.
- 2, 3. None.
4. 19 years.
5. 2 to 10 years.
6. 4 to 8 years.
7. A small per cent during last year.
8. Very limited extent.
9. One case in two years; others, I think, a longer time.
10. March and April seem to breed more sequelæ.
- 11, 12. Nothing.
13. I think good ventilation has been of benefit; but in most cases where they have had it, it has been owing to the impossibility of preventing it.
14. Nothing particular under this head.
- 15, 16, 17, 18. Nothing.
19. I think the nearer the approach to perfect health the lighter the disease. I think children of scrofulous diathesis are more liable to the sequelæ of dropsy.
- 20, 21. Nothing.
22. Nothing. Typhoid fever is very rarely here.
23. Think I have seen them concurrent, but not worse on this account.
- 24, 25. Nothing.
26. About 3 to 1.
27. No observation.
28. Have seen but little complications.
29. No observations.
30. About 2 per cent.
31. Small per cent.
- 32, 33. No observations.
34. No.
35. No observations.

* The figures beginning paragraphs refer to questions in Circular 17, on pages 394-7 of this Report.

- 36, 38. No.
40. Nothing.
41. People just comfortably situated get along best with this disease.
42. Nothing.
43. No opinion.
44. I think in one case two days seemed to be the time.
45. Cannot say.
- 46, 47, 48. Nothing.
49. I think any time from commencement of eruption to completion of desquamation.
50. I think about the commencement of desquamation.
51. Not definitely.
- 52, 53. Cannot say.
54. No speculations or theories.
55. No.
56. About a week.
58. About 3 weeks.
60. I think I call them sick 3 weeks.
61. About 2 weeks.
62. Bronchial or laryngeal obstructions.
63. About 1 to 20.
65. I had one case in the country of which I could not find any apparent exposure, and the case was so light that I doubted the diagnosis. This was in a child about 4 years old. A sister about 2 years old took it from this one and had it very light, but more marked than the first case. From this point it spread through the neighborhood, some very severe cases resulting therefrom. The family had not been visiting where there were any sick with this disease, and they never could believe that any one brought it to them.
66. I think it would be a good plan for health physicians to have a number of copies of the pamphlet you sent out with this circular, so that they might put one into the hands of parents or guardians of every house where this disease is present.

Otsego, Allegan Co., Mich., May 4, 1877.

DR. MILTON CHASE.

Health Physician of Otsego Township for 1877.

REPLIES BY R. F. STRATTON, M. D., OF ST. JOSEPH, MICH.

Secretary State Board of Health :

DEAR SIR:—I send you below *some* answers to the questions in your Circular No. 17.

1. Ten days.
2. None.
3. 2.
4. 20.
5. 2 to 6.
6. 4.
7. 50 per cent (estimated).
8. A great many.
9. 1 to 2 years.
10. Nearly all between December and May.
11. In my opinion, a dry state of the atmosphere favors its spread, and also its severity.
12. Cold weather favors the propagation and severity.
13. Made no observations.
14. Nothing but conjecture, which, of course, would be in favor of sanitary conditions.
15. No experience except under good conditions.
16. No chance.
- 17, 18, 19, 20, 21, 22, 23, 24, 25. Nothing.
26. This year 3 to 1, mild.
27. Not observed.
- 28, 29. Nothing.
30. Not over two per cent.
- 31, 32, 33. Nothing.

Our location is on the bluff overlooking the lake which lies to the west, from whence come the prevailing winds. During the past Winter the wells were very free from surface water. The season of the year forbade malarial complications.

Every precaution was taken that the disease should not be disseminated through the schools. Infected families were isolated as far as possible.

The disease was wonderfully general, very few children escaping. But under these favorable conditions a very small percentage of the cases were severe; but one case died—a nursing infant with cerebral complications. I have heard of but one case of dropsy, that evidently renal; no case of abscesses about the neck.

I attribute our favorable results to the above-mentioned favorable sanitary conditions.

St. Joseph, Berrien Co., Mich., May 7, 1877.

R. F. STRATTON.

SOUTHERN-CENTRAL DIVISION OF THE STATE.*

REPLIES BY WM. WORSFOLD, M. D., OF AUGUSTA, MICH.

Secretary State Board of Health:

DEAR SIR:—Circular No. 17, in reference to scarlatina, came to hand in course of mail.

We have had *no scarlatina here or in this vicinity* this Winter. My replies are based upon my observations and notes of epidemics prior to this year.†

1. Youngest case observed was in baby of 3 months. This was well marked: sore throat and rash.

2. Have not observed it in any.

3. Have observed it in several cases.

4. 40.

5. I think from 1 to 10 years.

6. I find that my most quickly fatal cases were in infants from 8 months to a year; the next were a year and a half to 2 or 3; these cases were overwhelmed by the disease, and were ended in a very few hours.

8. Have observed second attacks several times; have seen one or two cases of 3d attack.

9. Can give data in only two cases, 5 years and 12 years.

10. Winter and early Spring epidemics have been most prolific in cases, under my observation.

13. That the cases are more malignant, and the *angina very much worse*, where the ventilation was not good.

14, 15. Have observed cases in which location, etc., seemed contradictory to virulence of the disease; yet, in one instance at present in mind, 3 of the most malignant cases I ever treated were seemingly traceable to soil saturation beneath their sleeping-room and the room in which they played when in-doors; one boy who was older and slept up-stairs, had a light attack; he escaped whilst the others all died.

19. A deranged condition of health seems to increase susceptibility.

23. Have not seen them together frequently, but have generally observed them preceding or following each other.

27. 108°; fatal.

29. I think albuminuria at some stage of disease is very general.

30. About 10 or 15 per cent.

34. No.

38. Yes.

39. I have frequently ordered exposure to sulphurous acid fumes in close apartments, and large packing cases; burning sulphur was used; I have also used chlorine. I think they were both effectual.

40. Aside from contagion, I have noticed no influence.

41. My worst cases have been in lower orders.

44. 3 days, scarcely.

46. Have conveyed the disease myself.

49. When the disease is well established and in its decline.

50. During stage of decline.

52. I think the cases in which there is the greater amount of throat trouble have been the centers of greatest dissemination.

54. I think by the air passages.

56. From 5 to 7 days; 7 days would be exceptional.

58. About 3 weeks.

60. From 2 to 3 weeks.

* For counties included in each Division, see Exhibit 1, page 171.

† The figures beginning paragraphs refer to questions in Circular 17, on pages 394-7 of this Report.

61. From 3 to 6 days.

62. In some fatal cases, and those most quickly so, no symptom has been prominent, the powers of life seemingly have been destroyed by the onset of disease; in the most numerous cases, however, the *throat* symptoms have been prominent at death.

63. From 15 to 20 per cent. The first part of epidemic generally higher.

66. I think *complete, perfect isolation of patients, for 15 or 20 days, imperative*; as also thorough disinfection of apartment, and clothing, and excretions, and ventilation and disinfection of air of the room.

These measures are, in a general way, what ought to be rigidly enforced in every instance, especially isolation. Absolute quarantine regulations will, I think, place our practice upon a more rational basis with regard to scarlet fever than it has enjoyed heretofore.

Trusting that these incomplete items may haply be of some little service to you, with compliments, I remain, Yours respectfully,

Augusta, Kalamazoo Co., Mich., May 10, 1877.

WM. WORSFOLD.

REPLIES BY E. N. PALMER, M. D., OF BROOKLYN, MICH.

Secretary State Board of Health:

In reply to Circular No. 17, relative to scarlet fever, I would say that I have had but few cases to treat, consequently have had but few opportunities for observation. My notes of cases in the year of 1870 are lost, so that I shall have to report partially from memory.

1. 13 months.

2. None.

3. In 2 cases.

4. 19 years.

5. From 1 to 5 years.

6. Under 2 years.

7. Cannot say, as I have been here but five years, and know of but four cases in that time.

8. None, except where the first time they probably had roseola.

10. My cases have all occurred between Jan. 1 and last of April.

11. Could not say.

12. The months have been mild for that season of the year.

13. The more perfect the ventilation the milder the cases.

14. Damp cellars, cesspools, ditches, and swamps have a marked deleterious effect on the disease.

15. Cases are more severe when the soil is saturated with water.

16. Nothing.

17. During the last month a number of horses have had the distemper badly, and some died; most of them having a sequela of dropsy. I had a chance to make a post-mortem on two; found the kidneys very much inflamed and congested; did not get a chance to test any urine. Since my attention has been called to it, I am rather inclined to think that the distemper in horses, such as we have had here, is of the same nature as scarlatina.

18, 19. Nothing.

20, 21, 22, 23, 24, 25. None.

26. 70 per cent.

27. Notes are lost.

28. About 70 per cent.

29. About 20 per cent.

30. About 40 per cent.

31. About 10 per cent.

32. Have had no experience.

33. Have had no cases.

34. Yes.

35. That where *complete* isolation is secured then the disease stops, as a rule.

36, 38. No.

40. No experience.

42. As to severity and fatality of the disease, the Irish stand first; Germans, second; and English and Americans, third.

43. I have lost but two cases, both females.

44. 5 days.

45. 2 weeks.

46.* Peter K.—I was called hastily from the house where I was visiting a family where there were four sick with scarlet fever, to see this gentleman, who was then suffering with delirium tremens. I had to go about 40 rods. In ten days he had scarlet fever. A young lady who assisted in nursing him communicated the disease to her younger sister at home, aged 4 years, who was taken sick in 5 days after. The distance between residences was about a mile. As complete isolation was effected in this last case, the disease spread no further. These cases were in Manchester, in the year 1870. Only the three families had the disease there at that time.

47. The family first taken in M. lived in a house where there had been scarlet fever some three years before. The children who had the fever had not been exposed to any other contagion.

49. From the first stage of fever until desquamation is complete, in my opinion.

50. Depends very much on ventilation and disinfection.

51. No.

52. Cannot say.

53. Perspiration, breath, etc.; in fact, all emanations from the body.

56. From the 7th to the 10th day.

60. 2 weeks.

61. The duration of one of my fatal cases was 23 days, of the other, 5 days. This child was but 19 months old, and just convalescing from an attack of double pneumonia.

62. Ulceration of the throat in first case, coma in second.

63. 18 per cent.

65. March 29, 1877, I was called to see a child sick with scarlet fever, in the town of Woodstock, Lenawee Co. With the exception of one house, there were no residences within $\frac{3}{4}$ of a mile. There was no scarlet fever within fifteen miles, to my knowledge. The house was new. The child or family had not been away from home for three or four months. The family were Irish, and very poor, barely having the necessities of life. The child died the 20th day. Against my express commands, a lady living on the opposite side of the road, assisted in the care of this child. Her youngest child took the fever, and a son-in-law carried it from there to his residence, $\frac{3}{4}$ of a mile distant, where, in due time, another child had the fever. There were no other cases in our vicinity, except a youth, aged 19, who sat up with the corpse, above mentioned, the night before burial.

66. I think that the document just issued by the State Board of Health is the best work on the restriction and prevention of scarlet fever extant, and that it should be in the hands of every family in the State of Michigan.

All of which is respectfully submitted.

Brooklyn, Jackson Co., Mich., May, 1877.

E. N. PALMER, M. D.

REPLIES BY W. B. SOUTHIARD, M. D., OF KALAMAZOO, MICH.

1.* Three months.

2. I do not remember of any.

3. Cannot tell, but frequently.

4. About 30 years old.

5. 1 to 10 years.

6. 3 to 5 years.

7. I judge 30 per cent.

8. I believe not more than 5 per cent.

9. I have not observed.

10. Usually prevails more in February and March.

11. I believe that in damp and muggy weather it is more easily disseminated and more fatal.

13. Perfect ventilation does much toward rendering the disease mild and less virulent.

14. In damp and low localities the disease is usually more severe.

20. I believe that the causes that produce diphtheria aggravate scarlet fever.

26. I believe that 75 per cent are mild.

34. No.

49. From onset of fever until desquamation has been completed.

50. During desquamation.

52. Severe cases.

53. The bran-like scales.

* The figures beginning paragraphs refer to questions in Circular 17, on pages 394-7 of this Report.

54. I believe that particles of those scales are inhaled.
 55. From fifth to seventh day.
 57. 10 days.
 59. 15 days.
 60. 4 to 7 days.
 61. 10 days.
 62. Rapid and feeble pulse and cold surface; great restlessness.
 63. I passed through an epidemic in Newark, N. J., in which the mortality was very great; I judge 20 per cent; what I have seen in Kalamazoo, I should say 5 per cent.
 64. I have known of a servant girl who was at work where children were having it, visiting her home several blocks away and conveying the disease to her family.
 66. Isolation of the sick, and thorough ventilation I believe to be practical and of great value.
- Respectfully,
W. B. SOUTHARD, M. D.
- Kalamazoo, Kalamazoo Co., Mich., June, 1877.*

REPLIES BY H. C. CLAPP, M. D., OF MENDON, MICH.

Secretary State Board of Health:

DEAR SIR:—In response to your circular of questions concerning scarlet fever, I submit the following:

1. About 6 months—nursing.
2. Not any younger than above mentioned.
3. One—6 months old.
4. About 18 years.
5. Between weaning and 9 years of age.
6. Under 7 and over 10 years.
7. About one-fifth.
8. Never saw a well authenticated second attack. Patients are frequently said to have had a "scarlet rash" previously.
10. More cases during Fall and Spring and open Winters.
11. Damp and changeable weather seems to favor its dissemination.
12. A *cold*, humid atmosphere more favorable to its development.
13. Patients *always* do better in well-ventilated apartments, and are less liable to communicate the disease to others.
14. Cannot recall any cases thus conditioned, but think they might have a great influence in its dissemination—at least might add to its malignancy.
- 15, 16, 17, 18. Have no data.
19. Think a person in *good* health not liable to take it, and occupations promote the disease only as they impair the health.
20. Have observed no relationship; they seldom have occurred in my practice in the same community. Never in the same family at the same time.
22. Pathological changes frequently accompanying ordinary attacks of scarlatina, include all those of the first stage of typhoid fever, and the transition from one disease to the other is but a natural pathological sequence, readily determined by any cause which may increase the intestinal irritation. I am inclined to the belief that typhoid fever is not a disease *per se*, but that *it* and all its attendant phenomena may occasionally become a part of almost any other general inflammatory condition, specific or simple.
25. Have observed no relation to any of these diseases, nor to any other; I think it a specific disease, *sui generis*.
26. About 3 to 1.
27. I have treated but few cases of scarlatina since I commenced the use of the thermometer, and all mild—think the temperature did not exceed 104° F. in any of them.
28. About 1 to 10.
29. No data.
30. About 1 to 20.
31. About 1 to 6.
34. Only to a limited extent, and that in favor of isolation.
- 36, 38. No.
40. No further than close confinement and excessive mental labor, by their enervating tendencies, would exert.
41. Nothing, save where the hygienic conditions differ.
42. Nothing.

43.* Females are more liable to the disease than males, at least I have treated two of the former to one of the latter.

44. Four days.

45. No data.

46. A lady who was attending a grand-child sick with the disease, visited a family several miles distant, and their little four-year-old girl, whom she fondled considerably, was taken with the disease on the *fourth day*. There was no other known source of contagion.

47, 48. Have no data.

49. At any time from the commencement of the initial fever until desquamation is entirely completed.

50. When the eruption is fully out, and until desquamation is mainly completed.

52. The malignant and anginose variety.

53. That from the throat, nose, and mouth.

54. *Mainly* through the lungs; I can adduce no evidence.

55. I have no evidence of its being animalculæ, but believe it to act as a blood-ferment, possibly of the nature of the cryptogam.

56. From 7 to 12 days.

57. It has sometimes begun as early as 5 days, and again been delayed 2 weeks.

58. In the majority of cases, at the end of the 2d week.

59. Do not remember of any prolonged beyond the 3d week.

60. About 2 weeks.

61. 3 to 10 days.

62. Diphtheritis.

63. From 8 to 10 per cent.

65. I have treated many cases that seemed to spring up spontaneously, never having been exposed to any known contagion.

66. Complete isolation, perfect ventilation, and the use of proper disinfectants are the only preventive means which, in our present state of knowledge, can be employed to arrest this most dreaded scourge of children. I have no confidence in *belladonna* as a preventive, and have had but little experience with the sulpho-carbolate of soda.

Very respectfully,

II. C. CLAPP.

Mendon, St. Joseph Co., Mich., June 6, 1877.

REPLIES BY N. I. PACKARD, M. D. OF STURGIS, MICH.

Secretary State Board of Health:

DEAR SIR:—In replying to your Circular in regard to scarlatina, I would premise that I never have had any experience with the disease in the form of a wide-spread severe epidemic. I have treated a few cases annually for the last 27 years, many of which I have been unable to trace to any source of contagion. Have seen cases arise apparently spontaneously, which have been communicated to others in the same or neighboring families. Have also observed cases of some severity which were imported which did not affect those exposed to its influence, although no protection by a previous attack was known to exist.*

1. 6 months.

2. Never.

3. Often; no record of number.

4. About 47 years.

5. The most cases from 3 to 10.

6. Don't know.

7. 75 per cent (approximation.)

8. No instance where the diagnosis was positive.

10. Most frequent in Jan., Feb., and March.

11. Nothing special.

14 to 20. Nothing.

21. Often affections of joints at period of desquamation, never attributed to rheumatism, however; only one case of pericarditis recollected.

22. Nothing.

23. Often occurring at same time, nothing further.

24, 25. Nothing.

26. 90 per cent mild in my experience.

27 to 33. I have no data from which to reply.

34. Yes.

* The figures beginning paragraphs refer to questions in Circular 17, on pages 394-7 of this Report.

35. The fact of cases imported into a neighborhood not being communicated where isolation was thoroughly carried out; I have seen the same, however, where no precautions were taken.

36, 38. No.

40. None.

41, 42. Nothing.

43. None.

44. 5 days.

45. 18 days.

46. In one case where the mother of a child 4 years old visited, in a neighboring town, a family suffering from "scarlet rash," the child took scarlatina in an aggravated form on the 13th day.

47. In one case, three families occupying in succession the same house, at an interval of some months, all had scarlatina without any other known source of contagion; no precaution in the way of disinfection had been taken.

48, 49. No facts.

50. I do not know.

51. No.

52. Have observed no difference.

53. The products of desquamation.

54. I have no evidence and consequently no belief.

55. No.

56. About the 5th day of the eruption.

57. I have no data.

58 to 61. I have no records from which to reply.

62. Cerebral symptoms.

63, 64, 65, 66. I have nothing to communicate or suggest.

Very respectfully,

Sturgis, St. Joseph Co., Mich., May 24, 1877.

N. I. PACKARD.

REPLIES BY C. W. BACKUS, M. D., OF THREE RIVERS, MICH.

Secretary State Board of Health:

SIR:—Enclosed find replies to questions relative to scarlet fever. I have had but very few cases in this vicinity for the past 8 years, and those we had seemed isolated. Could not trace its contagion. This Spring, two months or so ago, there were 6 or 7 cases, in charge of another physician in our town. Saw three of them during the stage of desquamation, suffering then with acute articular rheumatism. One of those cases died. Could not find the source from whence they got the disease.*

1. About 18 months.

2, 3. None.

4. 16 years.

5. Between 2 and 12 years.

6. 2 to 10 years.

8. None, to my recollection, though I may have had such cases; 8 or 9 years ago we had an epidemic of the disease here; but as I have no record, I cannot answer many of the questions.

10. Winter and Spring months.

21. The cases with rheumatism, mentioned above, and death, were caused no doubt from heart affection; child was dead before I saw the cases.

34. No, and not in the cases mentioned.

38. Yes.

39. Chloride of lime and chlorinated soda,—also burning sulphur in the room; and there has not been any case since, from any contagion or infected clothing of these cases.

49. As soon as the eruption makes its appearance.

50. At that time and during the desquamative stage.

51. No.

54. By inhalation of impregnated atmosphere.

56. 8 to 16 days.

58. 3 to 5 weeks.

60. 4 weeks.

Respectfully submitted,

Three Rivers, St. Joseph Co., Mich., Aug. 24, 1877.

C. W. BACKUS.

REPLIES BY L. S. STEVENS, M. D., OF THREE RIVERS, MICH.

Secretary State Board of Health:

DEAR SIR:—As we have been highly favored by an immunity from scarlet fever for several years past, until it broke out last Fall in a neighborhood some ten miles from here, I do not feel confidence in my ability to fill out the requirements of the circular satisfactorily; yet I will do the best I can, taking the last appearance of the disease for my data.*

1. About 8 months.
2. None.
3. Quite a number, I could not say positively.
4. About 18 years.
5. I think from 3 to 5 years.
6. From 2 to 4 years.
7. I could not give the proportion. It did not prevail generally.
8. None.
10. It prevailed most severely in cold and damp weather.
11. As above (Ans. to Ques. 10).
12. More fatal cases in cold weather.
13. I think large and well-ventilated rooms lessen the severity of the disease.
14. Houses with damp cellars, and near low, swampy land seem to be favorable in developing the disease.
15. In marshy districts it prevails with more severity.
16. No cases have appeared in this vicinity.
- 17, 18. No data.
19. Enfeebled and poorly-fed patients seem to take it readily.
20. Have had no cases.
21. Rheumatism and heart disease were sequelæ in a number of cases.
- 22, 23, 24. None.
25. Many diseases and affections seem to be induced by scarlet fever.
26. About one-half.
27. Did not have the means to ascertain.
28. About one-fifth.
29. A number. I could not give the proportion.
30. About one-fourth.
31. Nearly one-half.
32. I have had no examples of such cases.
33. None.
34. No.
35. None.
36. No.
38. Could not thoroughly use the means with my patients.
40. It seems rapidly disseminated when introduced in a school.
41. Do not observe any difference in severity.
42. None.
43. Most of my patients were girls.
44. About 5 days.
45. 2 weeks.
46. I have no positive data, but I believe it may be communicated by all those means.
- 47, 48. None.
49. From the time the mucous surfaces are excited and fever exists.
50. Just before and at the time desquamation begins.
51. Think after the patient is entirely well and its clothing thoroughly renovated; not until then.
52. Not able to say.
53. I think the secretion from the throat and nostrils.
54. I am not satisfied on this point, but think it is immediately taken into the circulatory system.
55. I am in the dark.
56. About 1 week.
57. Nearly 2 weeks.
58. About 3 weeks.
59. Something over 3 weeks.

* The figures beginning paragraphs refer to questions in Circular 17, on pages 394-7 of this Report.

- 60. About 3 weeks.
- 61. 8 to 12 days.
- 62. Symptoms of blood-poison.
- 63. About one-sixth.

64. I believe the disease was introduced here from Chicago by a child visiting in this vicinity, who was sick and died here, after which the disease soon made its appearance and prevailed quite extensively and fatally in one neighborhood some miles from town. A few cases appeared in town, but of a milder form and among a few poor families; but of some fifteen cases in town, I think but one died during the acute stages of the disease, and one some weeks after it was supposed to be well.

66. A thorough organization of boards of health, with active and thorough men in them.

Respectfully,

Three Rivers, St. Joseph Co., Mich., May 4, 1877.

L. S. STEVENS.

SOUTH-EASTERN DIVISION OF THE STATE.*

REPLIES BY W. H. ROUSE, M. D., OF DETROIT, MICH.

Secretary State Board of Health :

DEAR SIR:—Subjoined please find answers to Circular No. 17. Quite a number of the questions can be answered only approximately, while others refer to matters of opinion in which full proof is not at hand.*

- 1. 5 months—nursing.
- 2. None.
- 3. Only a few; I have preserved no record of them.
- 4. 17 years, a young lady.
- 5. From 1 to 12 years.
- 6. About 2 or 3 years, and these from sequelæ.
- 7. Very large proportion, but I have no statistics.
- 8. About 3 per cent.
- 9. Quite various.
- 10. I have seen more cases in Spring and Fall than in Winter or Summer.
- 11. About the same as on other acute diseases.
- 12. But little, *per se*.
- 13. Imperfect ventilation quite injurious. Do not like to have these patients in small rooms.
- 14. Similar to other acute diseases.
- 16, 17, 18. None.
- 19. It seems to attack the robust about as readily as any.
- 20. They may be associated, but are not necessarily connected. Throat difficulties are common in some epidemics of scarlatina, and may arise from the condition of the atmosphere.
- 21. This season, rheumatism¹ (myalgia), and occasionally heart disease, have not been unusual; but we have had many cases of influenza—called diphtheria by some—which have been attended by myalgia; it would not be just to attribute all to scarlatina. These diseases are sometimes seen as sequelæ.
- 22, 23, 24. None direct.
- 25. There are similarities, but I have been able to prove no direct connection.
- 26. About 80 per cent. This year severe cases have been unusually rare.
- 27. Have preserved no record of temperature in full for comparison.
- 28. Varies with the epidemic.
- 29. Albumen found in all cases tested.
- 30, 31. About 5 per cent.
- 32. Have none bearing directly on this question.
- 33. Have observed no particular difference when other conditions were the same or similar.
- 34. Yes.
- 35. In all cases where it was practicable and duly tried, the other members of the families escaped. Sometimes with the greatest exposure, similar results have been observed. I saw a boy with a severe attack of scarlatina. The house and surroundings were unfavorable. Many children were in the room from time to time for about one week, notwithstanding my orders to the contrary. About two weeks after

* For counties included in each division, see Exhibit 1, page 171.

the first case, a brother of the boy was similarly attacked. These were both quite severe; both recovered, but I could learn of no case traceable to these, and even three other members of this family, who were not protected by previous attack, escaped without the fever. In this case everything seemed favorable to develop many cases of scarlatina, and had any precautionary measure been adopted it would have received undue credit.* The only preventive treatment was ventilation and inunctions with carbolized oil.

36. No.

38. Not so as to warrant reports.

40. Have observed none further than debility induced.

44. Our knowledge of the exact time of exposure is often so indefinite that absolute facts are difficult to obtain. I have seen different members of the same family become affected one after another with intervals of one to fifteen days,—showing an irregularity of results from a common contagion, or very short periods of incubation.

45. See "44."

46. I have seen no case which was clearly traceable to any of these causes. They probably do occur.

49. All.

50. The eruptive stage.

54. Enters with the air in respiration.

56-59. The time and character of the desquamation depend very much upon the severity of the local inflammation. Where the eruption has been very light and of short continuance, the desquamation may be scarcely observable. Desquamation usually commences within a week and is completed in one to three weeks more.

60. 1 to 2 weeks.

61. 36 hours, unless from sequelæ.

62. Nervous prostration most common. They do not seem to rally from the shock at the onset of the disease.

63. Statistics are not sufficiently complete. I have lost very few from this disease.

66. Most children will have this ailment. Till we have some means of rendering them non-susceptible to contagion, our chief care will be treatment. After trying various methods of rendering the contagion less effective, I have found none better than disinfective inunctions. Sulphur is one of the best. Carbolic acid would be good, but it is not well to use it of sufficient strength. There should be abundance of fresh air.

Yours truly,

Detroit, Wayne Co., Mich., May 28, 1877.

W. H. ROUSE, M. D.

REPLIES BY ROBERT JOHNSTON, M. D., OF MILFORD, MICH.

Secretary State Board of Health:

DEAR DOCTOR:—In answer to Circular 17, relative to scarlet fever, I take pleasure in sending the following reply, which is as accurate as I can make at present.†

1. 10 months.

2. None.

3. 3 cases.

4. 45 years (Mrs. C. Riley of this place). A severe case.

5. From 4 to 8 years.

6. When less than one year old.

7. Should say 50 per cent.

8. None that I know to be such.

10. It has been most prevalent here during cold weather.

11. Nothing.

12. None, save as referred to in answer to "10."

13. It has been more fatal, and more readily conveyed to others where ventilation has been imperfect.

14 to 25. Nothing.

26. Should think 10 to 1.

27. 106°. Girl aged 10 years. Died sixth day, of nervous exhaustion.

28. Do not remember a case that was so complicated.

29. In about 10 per cent.

30. Perhaps 3 or 4 per cent.

* [From the sentence which follows, it appears that some "precautionary" measures were adopted.—H. B. B., Sec'y.]

† The figures beginning paragraphs refer to questions in Circular 17, on pages 394-7 of this Report.

31. In 5 to 10 per cent.
32. Have no evidence bearing upon the question.
33. None.
34. It has, with good success.
35. I tried it in a family of 10 children of ages varying from 2 to 18 years, and limited the disease to the first child taken, a boy aged 8 years.
- 36, 38. No.
40. None that I know of.
- 41, 42. Nothing.
43. None.
44. 24 hours. A child of Dr. Davis of this place.
45. 7 days.

46. O. S. Johnson, aged 29, married, a photographer, died here April 4, 1876, of scarlet fever, after an illness of 6 days. He, with his wife and three children, aged four years, two years, and three months occupied a room 60 by 20 feet, in second story of a frame building. There was no outside door to the room, and the ventilation was very imperfect. There were several small rooms separated from the main room by board partitions extending part way from floor to ceiling, so that, for all practical purposes, there was but one room, which was used as a photograph gallery, living, sleeping, dining, and cook room. The oldest child was taken with the fever a week before its father, and he probably took it from this child.

The day before Mr. J. died, his brother, E. E. J., a farmer living eight miles north-west of here, in Highland, came to see him, and remained with the family until after the funeral. The body of O. S. J. remained in the room.

The father and mother of Mr. J., also another brother and his wife who lived with them on a farm in Troy, twenty-five miles east, came and remained with the family until after the funeral.

Six days after E. E. Johnson returned to his home, his oldest child, a girl aged 8 years, broke out with the disease; a week later, two more were taken down with it the same day; and a few days later his youngest, aged 2 years, broke out with it. He had but four children,—all had the fever. One had albuminuria and dropsy; another had aural abscesses as sequelæ of scarlet fever; but all recovered.

The father and mother, brother and wife, returned to their home in Troy, and six days later a two-year-old daughter of this brother was taken with malignant scarlet fever, and died the third day of the disease.

Dr. LeBaron of Pontiac, who attended upon this child, said, in answer to a letter of inquiry: "The Johnson child that died in Troy, of scarlet fever, I am satisfied, contracted the disease through infected clothing.

There had been no cases of scarlet fever for a long time in the vicinity of either the family in Highland or that in Troy. I am satisfied after a careful examination, that there was no exposure in either case except by infected clothing.

O. S. Johnson's second child was taken with scarlet fever about the time that he himself came down with it. This child died, soon after its father's death, of the disease; but the infant, three months old, lived in the room with the three cases of fever and until after the funeral of its father, and never showed a symptom of the disease. I have been careful to describe this room at some length, a plastered room, very poorly ventilated, because I think the conditions could not have been more favorable for exposing the child, and I am surprised that it escaped the disease. I noticed a similar escape in the family of Jas. Minihan, of this place. In Dec., 1875, his two boys, aged respectively 8 and 6 years, had scarlet fever. Both cases were severe and protracted. His little two-year-old girl (there were but three children) occupied the room where the boys were lying sick, almost the entire time of their sickness, slept in the same room every night, and yet showed no symptom of any disease during the time, nor for months afterwards.

In Jan., 1875, Miss Stratton, a book agent, called at Geo. Teeple's house in this place, and in a room where his two children lay with scarlet fever, remained about twenty minutes. She walked from there to her uncle's, E. Ruggles, nearly half a mile distant. It was evening, and she remained during the night with her cousin Emma, aged about eighteen, rooming with her.

Next day Miss Emma R. went two miles out of the village to visit her sister for a week or two. The fourth day after rooming with Miss S., Emma R. was taken with scarlet fever. The case proved to be very severe. Her little niece, two years old, where she was visiting, also took it, but hers was a mild case. I am confident there was no exposure save by the clothing of Miss S.

47. Last Spring, a two-year-old daughter of Fred Crawford, of this place, was taken by her mother to visit a neighbor whose child had recovered from a mild attack of

scarlet fever three weeks previously. Mrs. C. had a great dread of the disease, but thought there could be no danger three weeks after recovery; but four days after her visit the child was taken with scarlet fever. I could hardly convince the mother that she had carelessly exposed the child by taking it into a plastered room in which within a month a case of the fever had been treated. The case proved to be mild and the child lived.

48. I have none.

49. I think during all, except incubative stage.

50. During the greatest febrile excitement.

51. No.

52. I know of no difference.

53. I do not know. Probably the expired air.

54. Judging from the shortness of the time of exposure, in several cases, I think the contagium enters with the inspired air. I believe the usual manner of invasion is by the lungs.

55. Believe it acts as a zymotic poison, similar to that of variola.

56. About the fifth day after the eruption appears.

57. 8 to 10 days.

58. 10 to 12 days.

59. 2 to 3 weeks.

60. 12 to 14 days.

61. 5 to 6 days. As an illustration of the terrible malignancy of "scarlatina maligna," I will relate the case of May Levansolere, of this village. She was taken with scarlet fever at 1 P. M., Feb. 7, 1876. She became unconscious 1 hour after first complaining. I saw her at 3 P. M.: pulse, 140; countenance, pale, and expression such as is usual as a result of severe shock; still unconscious; saw her at 2 A. M., and remained with her until a few minutes before she died. She was very restless, unconsciously moaning and tossing about all the time. The rash made its appearance in the throat several hours before death, and on the entire surface of the body during the last hour. She died 9 A. M., the 8th. She appeared to be in perfect health until twenty hours before death.

62. Nervous exhaustion.

63. The epidemics I have seen have been mild, and but few cases have died. I think, about 3 or 4 per cent.

64. See answer to "46."

65. I treated a case last month at the house of Robert Barr, of township of Brighton, six miles west of here. I made careful inquiry and have not been able to find any exposure of the child. It was a severe case of "scarlatina anginosa." Temperature for several days was 105°. The child, a girl eight years old, was delirious most of the time for five days. Pulse from 140 to 160. The rash was as full as I have ever seen it. Desquamation of the entire cuticle took place. I have met with scarlet fever several times during the past ten years where I have not been able to trace any source of exposure whatever. I have also observed the same inability to trace out any exposure in a number of cases of measles seen during the same time; and yet I believe that, if there are cases of either scarlatina or rubeola that are "spontaneous," such cases are very rare indeed.

66. I believe isolation of cases, and thorough disinfection of clothing, premises, etc., if properly carried out, will invariably result in the prompt disappearance of scarlet fever from any locality where it is prevalent.

Respectfully yours,

Milford, Oakland Co., Mich., Aug. 28, 1877.

ROBERT JOHNSTON.

REPLIES BY W. G. ELLIOTT, M. D., OF PONTIAC, MICH.

Reply to Circular No. 17, relative to scarlet fever.*

1. 4 months.

2. None.

3. 2 or 3 cases.

4. About 35 years.

5. 5 to 10 years.

6. 5 to 10 years.

7. 75 per cent.

8. I never observed it twice in the same individual. I have many cases of sore throat, and a few cases of mild, fully developed, said to have had it previously.

* The figures beginning paragraphs refer to questions in Circular 17, on pages 394-7 of this Report.

9. 3 to 5 years.
10. More prevalent during Spring, Fall, and Winter.
11. Humidity favors its dissemination.
- 12, 13. During cold weather artificial warmth and imperfect ventilation intensify the poison and render dissemination of the disease probable.
- 14, 15. Favors an increase of numbers and severity.
- 16, 17, 18. None.
19. Debility and occupation without due regard to sanitary measures tend to increase liability to the disease.
20. With diphtheritic membrane on tonsils, in fauces, and in nasal passages.
21. Occasionally pain and swelling of the joints.
- 22, 23, 24, 25. None.
26. 20 to 1, prevailed in vicinity from 1869 to 1874; mild, and few deaths.
27. 106°. Died.
28. 1 in 10.
29. 1 in 15 or 20.
30. I have not been in the habit of testing the urine, except when dropsy was manifest.
31. 1 in 25.
32. I cannot give cases, but would suppose the liability increased.
33. Location favorable for isolation and ventilation; result, prevention and mitigation.
34. Yes.
35. Complete isolation restricts the disease.
36. No.
38. Yes.
39. It has been customary with me to fumigate apartments by sulphurous acid gas, placing all articles possible in water and boiling them; and I have never known the disease to extend from such sources.
40. None, except such as result from neglect of proper ventilation.
41. None, except a disregard of hygienic and sanitary rules.
42. None.
43. Females are usually the nurses and are more frequently callers on the sick; consequently are more exposed and disseminate the disease.
44. 3 or 4 days.
45. 10 or 12 days.
46. Last week there was a case of scarlet fever, difficult to trace to its source, as the child, about 4 years old, had not been from home, though the disease had prevailed in the vicinity for 4 years. It was ascertained that the week before there had been at its home a visitor with a child about the same age, which had had some sore throat, fever and rash, which would not have been noticed except for the occurrence of this case. Many cases have been observed where it has been conveyed from house to house by females who assisted in nursing the sick.
48. None.
49. In all stages, until complete restoration of all the functions.
50. During the fever and desquamative stage.
- 52, 53. Any or all.
54. My belief is that it usually enters by inhalation and ingesta.
55. No; in absence of positive knowledge.
56. 8 to 10 days.
57. 12 to 14 days.
58. 3 to 4 weeks.
59. 4 to 6 weeks.
60. 3 weeks.
61. 10 to 15 days.
62. Asthenia or prostration.
64. See answer to "46." Many similar instances have occurred.
65. I know of none, and do not believe in such cases.
66. Isolation and thorough purification and disinfection are the means to prevent sickness and death from this disease.

Pontiac, Oakland Co., Mich., Nov. 7, 1877.

W. G. ELLIOTT.

REPLIES BY JOHN P. WILSON, M. D., OF PONTIAC, MICH.

Secretary State Board of Health:

SIR:—In trying to answer a few of the questions in your circular relative to scarlet fever, it is necessary to premise, as in some measure explanatory of the

paucity of my replies, that during my practice of over 20 years in this city, there has at no time existed what would properly be called an epidemic of scarlet fever; and having been at no *special* pains to make note of the comparatively few cases I have met, the data from which to make any extended reply are wanting.*

2. In none.

3. Very few.

5. From 2 to 14 years.

10. Winter and Spring months seem to favor the disease.

13. Have always instituted thorough ventilation, and deem it important in restriction.

20. Have not seen true diphtheria with scarlet fever.

21. In some cases swelling and tenderness of large joints, simulating rheumatism.

34. Only so far as possible in family dwellings.

35. None.

36. No.

38. Yes, as to sulphurous acid gas.

39. First arranging all clothing, bedding, etc., in the room, so as to give the gas free access to everything; closing all apertures, as far as possible, and burning sulphur in an iron pot; using alcohol to ignite; keeping room closed for 4 to 6 hours; then thoroughly ventilate.

46. The first of a family of 2 children, aged 2 and 6, was seized with scarlet fever, and died within the week with severe anginous symptoms. The elder little boy sickened before the other died, and in a few days after sunk in coma. A young lady acquaintance from the country, just recovering from an attack of the disease, spent the afternoon with this family some time in the week before. No word of warning or instruction had likely been given this young woman, nor did I learn that any means of disinfection had been taken. But here was a home made swiftly desolate: *and was nobody to blame?*

49. In all stages of it.

53. Excretions of the lungs and skin.

54. I have no evidence, but believe it to be through the lungs.

56. 6 to 8 days.

58. About 2 weeks.

62. Convulsions and coma.

65. I have often failed to trace the exposure. I will give the leading points (which, for special reasons, were particularly noted at the time) of the case of a little boy about 5 years old, living secluded, 4 miles from town. He had not been from home for a month previous to the attack, and had not been in contact with any one, save his parents and younger sister. His father, an invalid at the time, drove to town occasionally, as family wants required, but had no knowledge of being anywhere, or at any time in contact with any one in the remotest manner connected with the disease. It was mid-winter; the weather was severe, the roads bad, etc., tending to keep people at home. The boy awoke in the night with vomiting, headache, and fever. He had copious eruption, efflorescence, diffuse sore throat, swelling, and subsequent induration of the glands of the neck, and free desquamation. He recovered without a sequela, save the affection of the glands, which was slow to disappear, but they did not suppurate.

66. The valuable document recently issued by the State Board of Health would seem to include all that is useful by way of "prevention." The more general education of the people in regard to the terrible nature of the disease, both as to its ready communication, and, at times, its fearful fatality, is to be attained, perhaps, through the agency of the State Board,—but more thoroughly, I take it, by an honest effort, on the part of the physician himself, to do his whole duty in warning his patients of their obligations to themselves and to neighbors in this matter, as well as by a full compliance on his own part with the State law regulating the methods of prevention.

Very respectfully,

Pontiac, Oakland Co., Mich., May 16, 1877.

JNO. P. WILSON.

REPLIES BY E. P. CHRISTIAN, M. D., OF WYANDOTTE, MICH.

Secretary of State Board of Health:

In answer to your Circular Relative to Scarlet Fever, I transmit the following:*

1. I have no record, but believe it was 6 weeks.

2. In none, to best of my recollection.

3. In a very great number.

* The figures beginning paragraphs refer to questions in Circular 17, on pages 394-7 of this Report.

4. The oldest subject was but recently under my care, a lady aged about 65, who took it from her grand-child, about 1 year of age, of which child she took exclusive charge; sleeping with it by night and holding it by day. She (the woman) had, however, no rash, but a very severe throat affection, and severe constitutional symptoms, from which she recovered slowly. I have seen the same severe throat affection with constitutional symptoms in several cases past middle age, where scarlet fever in its normal type was prevailing in children of the family. I have never seen the rash out in a patient past middle age.

5. From 6 months to 10 or 12 years.

6. Under 5 years.

7. Have no means of knowing, as the population changes. I think two-thirds.

8. Only rarely in the complete type. Perhaps never when the patient has had the whole distemper, viz., the rash and the throat affection. When the patient has had only the rash with mild constitutional affection, he may have the sore throat on a subsequent exposure, and *vice versa*. I think, too, there is reason to believe that when but one side of the throat has been affected at one time, the other may be on some subsequent exposure, as is the case with the parotid in mumps. (This is only surmise).

9. Always several years.

10. The severest epidemics, both in type and number of cases, always occur in Winter.

11. No observation.

12. Cold below 32° F. preserves the contagium indefinitely. Warm weather very soon destroys it. Hence, according to my observation, no severe or general epidemics occur in Summer.

13. On the individual affected, as regards the disease, no perceivable effect; as regards others exposed, very much.

14. No observations leading me to suppose they exert any particularly modifying influence on the disease, other than that of impairing constitutional vigor by unhealthy emanations, etc., and thus affording the subjects less powers of resistance and recuperation.

15. In several epidemics in this place, the southern part of the city, which is low and the soil clay, has been much more generally affected than the northern, which is higher and has a sandy soil. But I have seen the severest individual cases in this latter portion.

16, 17, 18. No observation.

19. Have formed no conclusions on this point.

20. A very intimate relation of some kind, what I call epidemic relationship. When one prevails as an epidemic, there are likely to be frequent appearances of the other.

21. Scarlet fever is a not infrequent cause of heart disease, and oftener of rheumatism consecutive to impaired kidneys as one of its consequences. Also as a result of this, Bright's disease later in life, but still traceable to scarlet fever in childhood.

22. I have seen many cases where typhoid form of fever followed this disease; but have perceived no relationship to epidemic typhoid fever.

23. As epidemics of scarlet fever usually prevail in cold weather, which favors the preservation and spread of all contagia, we are likely to observe cases of measles occurring at or about the same time with an outbreak of scarlet fever.

24. The same may be said of whooping-cough;

25. And of any other contagious or infectious disease; erysipelas is a very ordinary precursor or concomitant.

26. I should think 80 per cent mild.

27. I have no record to refer to on this point.

28. Not very often. Have seen it in parturient women, sometimes fatal. With cutaneous affections it is not very uncommon.

29. Have not sufficient records to justify a definite statement; but I think the proportion is large.

30. Of mild anasarca affecting wrists, ankles, face, etc., probably 10 per cent or more. Of the cavities much less, probably 5 per cent or less.

31. As followed by other sequelæ in at least as large or larger proportion.

32, 33. Have no evidence on this point.

34. Yes, in many cases.

35. With complete success in restricting it, when I have succeeded in enforcing and maintaining strict quarantine, which is a very difficult matter, and can only be effected with intelligent and conscientious families.

36. Yes.

37.* All clothing, bedding, etc., has been kept near a hot stove for several days. Results satisfactory as far as appears.

38. No.

40. School life is the means above all others of its dissemination. I know of no other effect from it.

41. No influence whatever, except as it affords means of procuring early and proper attendance and supplying wants, etc.

42. None.

43. I have perceived none.

44. I have no data sufficiently positive to express an opinion.

45. In one case, a child in a family sickened with the disease 6 weeks after another child in the same family. They were kept in different rooms after the first child sickened until convalescence was well established. The second case may not have contracted the contagion prior to its separation. If so, it must have contracted it after all local and constitutional symptoms had subsided in the first one, or from the contagium attached to the surroundings.

46. I have seen many cases where this was the only surmisable, and the most rational explanation of means of communication, that is, excluding animals, in regard to which I have no evidence.

47. I have known a case where a house was vacated late in Fall or early Winter, by a family in which scarlet fever had recently prevailed, in a most malignant form, one child having died, the house remaining unoccupied until early Spring. One of the first occupants, a married woman, was attacked with the disease in a malignant form, in three weeks from entering it. There had been no cases for many weeks. I may have reported this before, also the case of a young lady contracting the disease from a borrowed book, there having been no cases of the disease in the place for weeks. The book had been used some weeks previously by a companion recovering from the disease. I could relate a number of similar instances.

48. I have no evidence on this point.

49. At any stage; probably even before the development of pathognomonic symptoms, as rash and tonsillitis.

50. During the continuance of rash and sore throat.

51. None.

52. I think the anginose most likely.

53. From the skin and mucous membranes.

54. My *belief* is, by the air passages. No evidence.

55. My *belief* is, that it acts upon the fluids by a zymotic or analogous process.

56. I think from 3 to 4 weeks.

57. I cannot say.

58. I think in from 4 to 6 weeks.

59. I cannot say.

60. I should say, from 3 to 4 weeks.

61. I have known, at the outbreak of an epidemic, deaths to occur in 6 hours or less from commencement of sickness, and again the struggle to be prolonged for two, perhaps three months, with a finally fatal termination. I feel it very difficult to express an opinion on this point; but of those that die in acute stage, I should say, from 5 to 10 days.

62. Usually symptoms indicative of septicæmic or uræmic poisoning, especially upon nervous system.

63. I have no record to go by; but I should estimate fatality somewhere between 5 and 10 per cent.

64. If the contagium may be conveyed by a book, as I have known, so may it also by a letter through the postoffice, a case illustrating which has been detailed to me. The exact particulars in all details I can not give. But a family in a distant part of the State wrote to relatives in another part, notifying them of a death in the family by this disease. The disease did not exist, and had not for an unknown length of time, in the place where the recipient of the letter lived. But within two weeks it broke out in the family.

If it may be carried by letters, so also by bank bills, etc., and so by any other vehicle.

65. I have seen many cases where no known means of communicability existed; but if the poison, in a low temperature, may preserve its activity indefinitely, and may be carried in our mails and by our currency, as well as by all other possible

* The figures beginning paragraphs refer to questions in Circular 17, on pages 394-7 of this Report.

vehicles and missives, the hypothesis of spontaneous origin of cases *de novo* is not necessary, though, in my opinion, it is not at all improbable.

66. I believe the contagium is very readily and very soon destroyed by heat. I believe that strict seclusion and as rigid quarantine regulations as are usually adopted in cases of small-pox, would be equally successful, or more successful, in preventing the spread of scarlet fever.

In this community, since I have been here, there have been four or more outbreaks of small-pox. In no one of these has the disease ever spread beyond those exposed prior to the disease being seen by the physician. This I attribute to the facts of rigid quarantine being at once established over the premises; seclusion of all the inmates; and exclusion of all other parties, except some one individual appointed by the authorities to supply the necessary communication with the outside; very great carefulness on the part of the physician in so timing his visits as not to go immediately to other patients; prompt vaccination or revaccination of all who have been exposed prior to his being called in; and usually a general vaccination and revaccination of citizens.

The same rigid seclusion and exclusion in cases of scarlet fever has very often checked the spread of the disease, confining it to the individual or family in which it appeared. But the one great difficulty is with the schools. Here the contagium is sown broadcast, and there is a simultaneous outbreak of cases in different parts of the community, all originating from perhaps a single case of a sickening child in the school.

When a case appears in a family, all other children of the family are at once excluded from the schools until full convalescence.

Any practical and fully sufficient method of meeting this difficulty it is impossible to see in the present state of popular intelligence, or rather lack of intelligence, on the subject. But the State Board of Health is doing a great work in educating the public on these matters.

Very truly,

Wyandotte, Wayne Co., Mich., May 4, 1877.

DR. E. P. CHRISTIAN.

REPORT OF ATTENDANCE,
ABSTRACTS AND REVIEW OF THE PROCEEDINGS
OF THE
AMERICAN PUBLIC HEALTH ASSOCIATION,

AT ITS ANNUAL MEETING AT CHICAGO, SEPTEMBER 25-27, 1877.

By HOMER O. HITCHCOCK, M. D.,

AND BY

HENRY B. BAKER, M. D.,

Both Members of the Association, and of the Michigan

STATE BOARD OF HEALTH.

AMERICAN PUBLIC HEALTH ASSOCIATION.

ANNUAL MEETING AT CHICAGO, SEPT. 25-27, 1877.

REPORT OF FIRST TWO DAYS' SESSION,—BY HOMER O. HITCHCOCK, M. D.

In accordance with a vote of the members of the Board, I attended the meeting of the American Public Health Association, and respectfully submit the following report of the proceedings of that meeting:

It was held in Chicago, one of the most remarkable cities, in some respects, in the whole world. Certain it is that the city at once presents an example of the needs of sanitary laws, and the beneficial results of such laws vigorously and intelligently executed, such as can be found nowhere else.

After a somewhat elegant and complimentary address of welcome by Hon. Wirt Dexter, Dr. John H. Rauch, the President of the Association, introduced the session of the first day by a paper upon the unfavorable hygienic situation of Chicago.

Prior to 1835, the present site of Chicago was a low, wet, boggy plain, covered with wild water-grass and flags, except where the water was too deep and too constant to permit even these to grow. Through this swamp the north and south branches of the river threaded their sluggish course, until by their junction within a mile or two of the shore of the lake, they formed the Chicago River.

This plain, for seven miles back from the lake, did not have an average elevation above the surface of the lake of eight feet. The original shore of the lake was shown to have been from two to four or five miles from the present shore, and the lake was believed to have had an outlet by a considerable river flowing southward and westward to the Mississippi. So Chicago is built upon the old bed of the lake, gradually filled up and grown over by rank weeds and grasses that, in their decay, have made a vegetable mould or humus—a kind of soil holding a very large amount of water, and filled with substances that, on exposure to the sun's rays, would undergo decay, and set free large amounts of noxious gases.

On such a site, Chicago sprang into existence, a full-grown city, as it were, in a day,—needing, to the last degree, the benefits of good drainage, and yet almost entirely destitute of the natural advantages to secure it.

Mr. Chesbrough followed with a paper detailing the manner in which these

disadvantages of situation had been overcome by the skill and labor of the engineer; how the river flowing into Lake Michigan had been turned back in its course and actually made to flow in the opposite direction, bearing away much of the filth of Chicago through a canal to the Illinois river, and thence through the Mississippi to the sea.

The members of the Association were invited to a little excursion to view the wonders of this engineering skill. They were first taken down through the river to the lake and out to the Crib, by means of which Chicago secures from the clear waters of the lake an abundant supply of wholesome water. Then, as if to set off what engineering skill has already done towards making Chicago hygienic in the cleanliness of her streets, the party was conducted up the south fork of the south branch of the river, a sluggish stream, almost without outlet, into which the blood and offal of large butchering establishments are poured to swelter and decay in the scorching sun. The party all had ocular as well as nasal demonstration that the millennium of hygienic conditions has not yet come for all Chicago. It is hoped that the canal may be deepened and widened so as to be a ship canal equal to the passage of the largest steamers, and that by suitable engines the clear waters of the lake may be driven through the rivers so abundantly as to supply the canal in large measure, and to carry off through it all the filth of Chicago.

As germane to the subject of this paper, Dr. Folsom, Secretary of the State Board of Health of Massachusetts, read a paper on the Pollution of Streams. At the close of his paper he presented a draft of a general law intended to prevent the pollution of streams. This was discussed at some length, and was finally referred to a committee to consider, conferring with Dr. Folsom, and report to the Association some action suitable to be taken upon the subject.

I think it would be very well and very timely for this Board to request the proper committee to prepare a paper on that subject, and to suggest some appropriate legislation for Michigan.

The evening session was opened by quite an elaborate paper by Dr. H. A. Johnson, of Chicago, on "The Sanitary Geography of Phthisis Pulmonalis and Other Pulmonary Diseases in Chicago and other Cities of the North-west." This paper discussed the following questions, viz.: 1. The Relative Frequency of Phthisis [Consumption] in the North-western and North-eastern States. 2. Does Phthisis, relatively to other causes of death, increase as population increases in the United States? 3. What is the ratio of that increase, if any, in the two groups of States mentioned above? 4. What causes modify the prevalence of the disease in those two groups of States, especially the North-western? This paper was almost entirely based upon the U. S. Census Reports for 1850, 1860, and 1870.

He reached the following conclusions, viz.: 1. Phthisis [Consumption] is and has been relatively to the population, more frequent in the North-eastern States than in the North-western. 2. Phthisis, while not becoming more frequent relatively to all causes of death as population increases, has become relatively more frequent in the North-western States. The paper considered somewhat the influences which appear to modify the prevalence of this disease, and arranged them according to their supposed importance in the following order, viz.: 1. The origin of the population, which means, I take it, "heredity." 2. The rainfall, storm movements, and temperature and humidity, modified by character of the soil. 3. Density of population and modes of living; and 4. Social and moral condition of the people.

Dr. J. M. Gregory read a paper the same evening, on "The Relation of Hygiene to Higher Education." This paper elicited thoughtful attention, and showed that the writer was thinking earnestly and well upon the question of preserving the health of our educated young men. He deprecated the systems of marking—prizes and honors—that have overstimulated but not evenly developed the minds of many who have carried away prizes or shone on commencement days, never to be heard of afterwards.

The papers of the second day were of much interest, especially that by Dr. Azel Ames, of Massachusetts, on the "Removal and Utilization of Domestic Excreta." After quite an extended and exhaustive review of the various methods that have been resorted to in this country and in Europe, for removal of the excreta in large cities, he reached the conclusion that every attempt at the utilization of excreta was pecuniarily a failure, excepting when the discharge of the sewers was near to the lands to be fertilized.

The disposal of excreta by water in well-constructed closets, and by a good system of sewerage, was believed to be the cheapest and the most wholesome method yet practiced.

For the parts of cities where excreta is deposited in cesspools or vaults, the removal by the odorless apparatus heretofore brought to the notice of this Board was considered the best method. This paper deprecated the dry earth system both in an economical and hygienic point of view.

Dr. Henry M. Lyman, of Chicago, read a paper on "Stamping out Scarletina and the Extinguishment of Zymotic Diseases," which presented no new views upon the subject, but appeared to be mainly an attack upon the methods adopted by the Board of Health of Chicago during their late epidemic.

The main points of interest in his paper were shown in connection with a chart, made up from the mortuary records of the city for the last twenty-five years. This chart showed, 1. That the city is almost never entirely without cases of scarlet fever; 2. That once in about five years there is a decided epidemic of the disease, continuing from one and a half to three years; 3. That the disease prevailed by far the most in the winter months—in contrast to diphtheria, which prevails most in spring or autumn months.

A paper prepared by Dr. Edward Hitchcock was read by Prof. Trowbridge, of Chicago, on the "Experience of the Department of Physical Education and Hygiene in Amherst College." This paper was of great interest, and a wide circulation of it cannot fail to do good. The Professor showed that since the inauguration of the department in the college, the young men had less sickness, were finer looking men upon the streets, and in the recitations, and even the moral and social conduct of the students was far better than formerly. Each class has a drill of one-half hour daily, under the direction of the Professor, in the gymnasium. According to the testimony of Prof. Hitchcock concerning the experiment at Amherst College, it does seem very desirable that such a department should be established and well founded in every university and college in the land. The exercise in the gymnasium is by no means the only benefit reaped by the students. They are instructed in the general and simple principles of anatomy and physiology, and especially in the practical applications of the laws of hygiene to matters of every-day life.

With such instruction for all the young men and women being educated in our colleges, the hygienic millennium would be several ages nearer than it now is.

Dr. N. S. Davis, of Chicago, gave a verbal outline of a paper he has in prep-

aration on "Means of Diminishing Infant Mortality from Bowel Affections." The Dr. did not seem to me to develop any new ideas on this subject, the main idea being that cholera infantum began and prevailed during the first week of continued hot weather. All the elements of the etiology of the disease could not be studied without more accurate statistics—not only of the temperature and the prevailing winds and the rainfall, but also of the amount of ozone and humidity in the air. Statistics of these last two elements are now being taken by several observers and correspondents for this Board.

The great remedy or means of prevention which the Doctor proposed was, to keep the babies cool, either by taking them, before the hot season begins, to a cooler climate, or to a floating hospital on fresh or salt water, or by cool bathing at evening, or a wet bandage around the body when they are put to bed.

In the evening, Dr. Andrews, of Chicago, presented a very good and suggestive paper on the gratuitous treatment of the poor, especially in some surgical diseases, as a means of keeping them from pauperism. He spoke of some diseases to which the poor ill-fed and ill-housed classes were liable, particularly diseases of the joints and the spine, which, if not promptly, intelligently, and efficiently treated, were almost sure to land their victims or those dependent upon them in the almshouse.

A little timely and judicious treatment by proper instruments and apparatus, gratuitously furnished, costing from ten to thirty-five dollars, which the patient may be wholly unable to pay, would save the public the expense of years of pauperism. I would suggest that a paper on this subject, especially if based upon certain facts that might be gathered, might be of considerable utility in Michigan.

In the evening we were favored with a very able and interesting address, by the Rev. Brooke Hereford, on "Public Health and Public Holidays," in which he made a strong plea for more holidays in this country—putting in strong contrast, in respect of their number of holidays, this country and England. He especially urged that half holiday on Saturday should be established here as it now is in England.

My presence at home being very necessary, I was unable to attend the sessions of the meeting during the third day, and shall have to refer you to our Secretary for a report of that day's proceedings.

I was very glad to have the opportunity of attending this meeting. I am sure the American Public Health Association is doing much to advance the cause of hygienic science and art, and much towards making the desirability and necessity of State Boards of Health felt by the people, and much in the way of assisting State Boards of Health in their work.

All of which is respectfully submitted.

H. O. HITCHCOCK.

REPORT OF THE LAST DAY'S SESSION.

BY HENRY B. BAKER, M. D.

By invitation, on the morning of September 27, the members of the Association visited the stock-yards, in the town of Lake, just outside of the city, and were politely escorted, by a member of the city council, through the various yards, buildings, and grounds used by the active business community which

there makes a little city by itself. Immense numbers of animals are slaughtered there, and some of the serious problems yet to be worked out relate to the lessening of dangers to the health of citizens of Chicago, which are, in one way and another, connected with the decomposition of the immense quantities of organic refuse from the slaughter-houses.

On returning from the stock-yards, the Association listened to a paper by Dr. O. C. DeWolf, Health Commissioner of Chicago, on the "Destruction of Offensive Gases from Rendering Tanks and Fertilizing Establishments." He said the importance of this subject would be seen when he stated that an ox produced from fifty to sixty pounds of offal, a hog from twenty to thirty pounds, and that last year there were 300,000 beeves, and 3,200,000 hogs, slaughtered in and about the city. The offal that comes from this immense number is "awful." There are 242 rendering vats in the city. In these the animal matter is subjected to heated steam under pressure. Formerly the gases evolved in this process were passed into the open air. He exhibited and explained a model of an apparatus recently invented to purify these gases, and said that so far as it had been tried it seemed to supply a cheap and effectual method of disinfecting and deodorizing such gases. In its use sulphur is employed in considerable quantities, but sulphuric acid is produced, and its sale goes far towards paying the expenses. Dr. DeWolf explained the drainage of the stock-yards, slaughter-houses, etc. The packing-houses have deposited in the river, blood, offal, etc., to the amount of thirty cubic yards of solid animal matter per day; and as there is little or no current to the river in that vicinity, the result can perhaps be imagined, though an inspection of the real condition showed it worse than I had imagined it could be. In May, 1877, they were asked to do something toward lessening the amount of decomposing material thrown into the river, and have constructed catch-basins which take up twenty tons of animal matter per day. Much has been done toward improving the condition of the water of that part of the river which is in the heart of the city of Chicago, but much remains to be done even there, and the work of purifying that part of the river into which the drainage of the slaughter-houses is carried will be of great magnitude, and its character is not yet determined upon.

Dr. DeWolf referred to the terrible epidemic of scarlet fever which had prevailed there for twenty-two months, mentioning the efforts which had been made for the restriction of the disease. Warning notices had been placed on the premises where the disease prevailed, and efforts had been made to isolate cases so far as practicable in such a large city, with so few of the inhabitants having a proper knowledge of the contagious character of the disease. He said the number of cases had not seemed to be dependent upon sanitary surroundings, but the death-rate was modified in the best wards of the city.

In the discussion which followed, Dr. Folsom, Secretary of the Massachusetts State Board of Health, remarked upon the probable relation of the pestilential diseases in Chicago and the bad condition of the atmosphere. Referring to the rendering of offal, he thought it should be insisted upon that it be done while it was fresh; he doubted if the gases can be properly disposed of if the offal is allowed to become putrid before it is rendered.

In the afternoon, Sept. 27, Dr. Elisha Harris of New York read "A Report on Plans for Securing Complete and Authentic Records of Deaths and Causes of Deaths in the United States." The subject was considered to be of great importance, and it was ordered that a copy of the paper be sent to each member

and officer of the several State Boards of Health. Each State Board of Health was expected to appoint a representative to confer with a committee appointed by the Am. Social Science Association, and with others, "with reference to devising and procuring a thoroughly efficient and uniform system of registration of births, marriages, and deaths and causes of mortality in all States in the Union."

Dr. Harris very well says: "The key to complete success in obtaining the reports, and whatever can at once be certified in any and all deaths, is the Burial Permit and the requirement of a record upon which to grant and issue such a permission. The Burial Permit and its registry should be made a prerequisite to the interment of any corpse." He further says: "The successful maintenance of an adequate system of records of mortality depends upon the official existence of a *central intelligence*, a bureau or department (in which shall be certainly one *expert*) in each State, for the purpose of directing the methods and perfecting the duties of registration of mortality, and generally, to supervise the Registry of the three branches of Vital Statistics."

Dr. C. N. Hewitt, Sec'y of the Minnesota State Board of Health, read an interesting paper on "The Relations of Hygiene to the Public Schools," in which he made a forcible plea for instruction in hygiene, advocating such instruction as of far more importance than are many kinds now enforced. Physiology may be taught, but hygiene is of much greater importance.

Several papers were read by title only, as there was not time to hear them all.

The members of the Association were invited to visit Hooley's Theatre to see a new system of ventilation, invented by Mr. E. S. Jenison, an architect, and formerly a resident of Michigan. The system is certainly peculiar, and has some features which make it quite attractive. It is called the Individual System of Ventilation, for a large proportion of the air to each individual comes from the out-door air, without admixture with that which has been breathed and rebreathed by others within the room, as is so commonly the case in most public assemblies. Before reaching the theatre, we were told that any person in the theatre could have a current of fresh air on any part of his body that he chose, and could vary the same at will. This is accomplished by a system of pipes which lead up to the front and rear of each seat, and which have movable terminations so that the fresh air which comes through these pipes can be turned, by the occupant of the seat, in any direction he chooses. In the basement of the theatre there is an ordinary fan "blower" which brings air down a shaft from above the roof of the building, passes it through a spray of water to wash out the dust, etc., and then forces it through the pipes to the seats, and elsewhere as needed. In cold weather, the air is warmed by being passed through an enclosed space, heated by an ordinary stove or furnace; and its temperature is regulated by controlling the proportion of the current of air which shall pass through the heated chamber, permitting a larger or smaller proportion to pass on without being warmed. The humidity of the air can be controlled at will, and it was demonstrated to us that the occupant of a seat could receive perfumed air if desired. These qualities of the air can be modified at the "blower."

In any such system, it is important that this apparatus shall itself be placed in a well-ventilated part of the building, or that it shall receive no air except from the shaft which comes from a good air-supply, because, otherwise, the blower tends to draw in air from its immediate vicinity, especially when the

door of the room in which it stands is opened to admit the attendant, and it is not desirable to send cellar air through individual air-pipes.

People are usually quite particular about having the small quantity of water they drink quite uncontaminated by other people, and it seems unreasonable that they should so generally put up with so much such contamination in the much larger quantity of air they breathe into their lungs. Perhaps they will appreciate Mr. Jenison's system of individual air-supply. The same system of ventilation has been adapted to the ventilation of sleeping cars.

The Chicago Tribune of Sept. 28, says :

"An eminently fitting close to the marked sessions of the Association, was the generous reception tendered to the members of the Association last night by Mr. Levi Z. Leiter, of the firm of Field, Leiter & Co. His elegant residence, No. 60 Calumet avenue, was brilliantly lighted and thrown open for the entertainment of the distinguished guests and a large number of representative citizens of Chicago; and the fact that so many responded to the invitations indicated an appreciation of Mr. Leiter's considerate hospitality. Eight o'clock was the time set for the arrival of guests, and from that hour till about 11 o'clock the visitors enjoyed the treasures of art and literature with which the mansion is replete, and the parlors were enlivened by the hum of conversation as those present discussed the topics of the day, the subjects of scientific investigation that have interested the Association for days past, the inscrutable mystery of Bridgeport, yesterday's trip to the stock-yards, etc."

The reception was a very enjoyable one, and such receptions do much to smooth the course of progress in public health movements and in sanitary science. They furnish opportunities for rapid comparisons of views, for statements of facts and occurrences, by sanitarians in different parts of the country and in slightly different kinds of sanitary work, as also for comparisons of views with prominent citizens interested but not engaged in such work. Many prominent citizens of Chicago were present at the reception at Mr. Leiter's, and without doubt the meeting will have some good effect on future sanitary measures in that city; and, as one of those present, I can say that I learned much during the Chicago meeting that I hope may in some way be of use in our own State.

Respectfully submitted.

HENRY B. BAKER.

A SPECIAL DANGER NEAR SWITCHES
ON
RAILROAD TRACKS:

LETTER, WITH DIAGRAM ILLUSTRATING THE SUBJECT, FROM
WILLIAM WORSFOLD, M. D.,
OF JACKSON, MICHIGAN;

AND SOME REMARKS ON THE SUBJECT BY THE SECRETARY OF THE
STATE BOARD OF HEALTH.

A SPECIAL DANGER ON RAILROAD TRACKS.

In a letter dated March 24, 1878, William Worsfold, M. D., of Jackson, Michigan, calls attention to the frequency of serious and sometimes fatal accidents which occur near switches on railroad tracks, because of the great liability of getting the feet caught in the angles made where two rails are placed near each other, as in the "frog," as the center piece where two converging tracks cross, is called, and in the "guard rail," which is placed toward the inner side of the outer rail on each of the converging tracks, opposite the frog, and near the switch.

Dr. Worsfold's letter transmitted a clipping from a Jackson newspaper, giving an account of a fatal accident, as follows:

ANOTHER FATAL ACCIDENT.—A BRAKEMAN KILLED INSTANTLY IN THE L. S. & M. S. YARD.—About half-past 1 o'clock to-day another of those sudden, but none the less dreadful railroad accidents we have so often to record, occurred in the L. S. & M. S. railroad yard in this city. Conrad Heinsen, of Adrian, brakeman on freight trains Nos. 48 and 49, who came in with his train this noon, and was assisting in making up the train upon which he returns, caught his foot in a frog, and fell face downward on the track, the wheels of the moving cars caught his head and crushed it on the rail, causing almost instantaneous death.

LETTER FROM WM. WORSFOLD, M. D.

Secretary of the State Board of Health:

DEAR DOCTOR:—I send you an account of the accident occurring yesterday, with fatal consequences, and also a communication with diagrams concerning this source of danger to the operatives, and here frequent outlet of human life.

Please oblige *me* by placing this on record, and *humanity* by taking such immediate action as the Board may be able to, and as the case merits.

The "frog" may be rendered harmless by having a block of wood fitted and spiked down in the angle (see diagram), so that the foot cannot be caught and retained by the projections of the two rails.

The "guard-rails" afford the very same kind of a trap, as they are made at present. I have drawn, in a rough manner, a proposed guard-rail, and suggested a more accurate placing of them; the top being beveled off at the ends so as to fulfill their purpose, and yet avoid the danger of trapping.

The accidents of this nature here are sometimes of every-day occurrence, and I think when the railroad companies have the prevention of these catastrophes within their easy reach, they certainly ought to be urged to take advantage of it.

Yours respectfully,

Jackson, March 24, 1878.

W. WORSFOLD.

On the diagram, Dr. Worsfold has written: "The guard-rail should be made straight, with the side of the top ground or turned off at the ends to prevent catching. The distance actually needed between the rails is $1\frac{3}{4}$ inches.

The guard-rails I notice are very inaccurately and carelessly placed, being at various distances and affording almost as complete a trap as the 'frog.' They should be placed accurately and at the distance named, and when the side of the top of rail at the ends is turned off to catch the flange of the wheel it would render the liability of catching the foot nil, as upon one side there would be a smooth surface affording chance of removing foot—even if caught—easily and quickly. The 'frog' has been the fatal place or angle here. Several men, during the last two or three years, have lost their lives through this unprotected angle."

The main diagram sent by Dr. Worsfold has been engraved, and may be seen in Fig. 1 of the accompanying illustration. In Fig. 2 on the same page, is exhibited substantially the same method of rendering the angle of the frog less dangerous, and also an application of the same principle to the reduction of danger at the angles formed between the end of the guard-rail and the ordinary rail of the track; the entire Fig. 2 being a drawing from an actual track in use in this State. It may be stated that at the station where the drawing was made no serious accident has ever occurred, while in the same city on another road, where the track is as represented in the lower part of Fig. 1, at least one fatal accident has occurred, a man having been crushed to death by a car while his foot was firmly held in what Dr. Worsfold has labelled in Fig. 1, as "the fatal angle" in the frog.

The valuable device figured and described by Dr. Worsfold seems to have been thought of by quite a number of persons, and is in actual use in at least two different parts of this State. Hon. LeRoy Parker, of Flint, a member of this Board, says that several years since he suggested this same procedure, so far as relates to the "frog."

Since the receipt of Dr. Worsfold's letter, I have examined a road, in this State, where the "frog" is in this manner rendered less dangerous; and I noticed that the broad end of the piece of wood placed in the approach to the frog was beveled down, so as to prevent persons catching their toes against what would otherwise be a square end. This seems to be an improvement; and a similar principle was acted upon to decrease the danger from catching the feet at the end of the guard-rails. A piece of wood was prepared to fit against the end of the guard-rail, the end farthest from the guard-rail being beveled down so as not to present a square end, and the side towards the main rail being also beveled, and this piece of beveled wood extended far enough into the angle between the guard-rail and the main rail to prevent the entrance of an ordinary sized boot, and was securely fastened in its place.

It would seem that no valid objection can possibly be made to the method of securely fitting with wood the "fatal angle" leading to the "frog." If this is so, a neglect to do this should be considered a wanton disregard of human life on the part of those railroad officials who are responsible for such neglect.

As to the guard-rail, it is possible that if there is a too rigid and contracted iron end of the guard-rail, there may be a slightly increased liability to throwing the train off the track, and thereby endangering more lives than are protected on the track; but this is hardly probable, except on the main line of road, in places where the train passes the switch at full speed; and at such places is not where the accidents, referred to by Dr. Worsfold, usually occur,—they being most frequent in yards, on side-tracks, etc., where there is much "shunting" and making up of trains; and in such places, at least, it would seem to be important that some provision be made for lessening the danger.

DIAGRAMS—Illustrating dangerous angles in railroad “frogs” and “guard-rails,” and methods of lessening the danger. Fig. 1, drawn by Dr. Worsfold. Fig. 2, as found in use on one railroad.

Fig. 2.

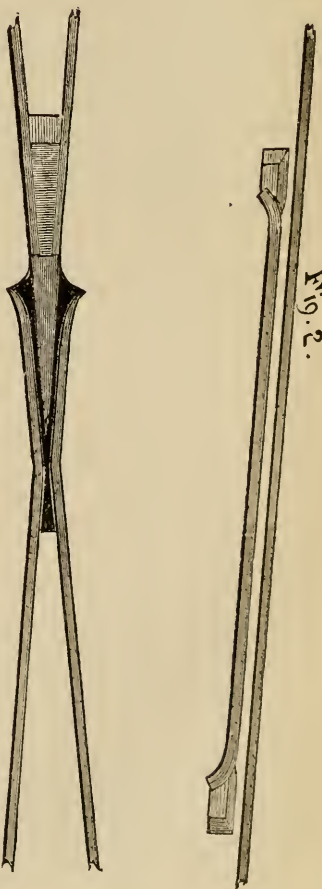
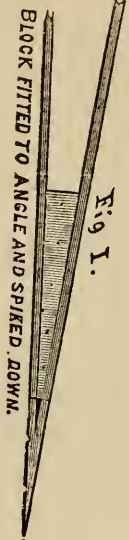


Fig. 1.



BLOCK FITTED TO ANGLE AND SPIRED DOWN.



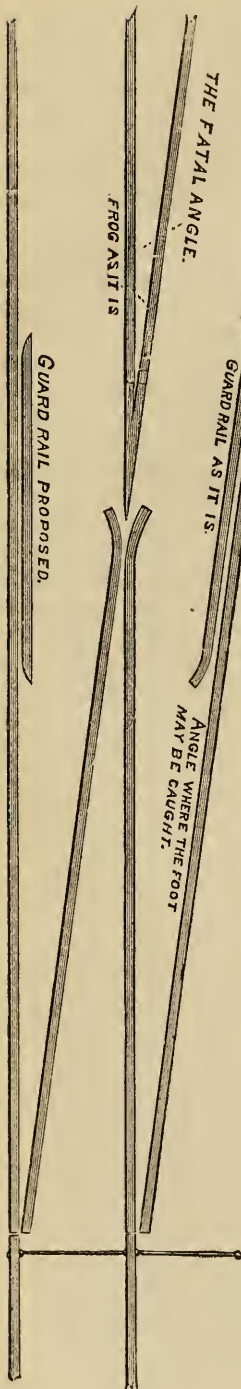
THE FATAL ANGLE.

GUARD RAIL AS IT IS.

ANGLE WHERE THE FOOT MAY BE CAUGHT.

FROG AS IT IS

GUARD RAIL PROPOSED.



When the guard-rail is treated on the same principle as is the angle near the "frog,"—the wood is sufficiently strong to keep out feet, and yet it would be more likely to yield slightly to the wheels of a car which had a slightly different width between the wheels, and permit the wheel to be guided by the flaring end of the guard-rail, in case of necessity for such a flaring end in order to engage the wheel.

In Fig. 2 in the diagram, printed herewith, is exhibited the guard-rail as rendered less dangerous by having the wooden blocks so placed as to prevent the catching of the foot in the angle.

If it be objected to such blocks, that it is possible that one might be so displaced as, under some circumstances, to throw the train off the track, it may be replied that the block of wood need not be large, it is not hard and unyielding; and at such places as there might be the danger of such an accident,—where fast trains pass on through lines,—there is least danger from the other accident, that of catching the foot of the brakeman who couples the cars, such work being more frequently done in yards where the trains do not run at full speed, and where any loose block would be likely to be detected before it was displaced in a dangerous manner. The blocks should be securely fastened, and when this is done they are not very likely to get out of place. Those examined had been in use for a year or more, and not one of them was so displaced as to be a source of danger, though one had yielded slightly, as before suggested, to a train which seemed to have demanded a little more than the usual space at the beginning of the guard-rail. So many lives are lost because of the dangerous angles on railroad tracks, that something should be done to prevent such occurrences. If there is any better way of preventing them than is here set forth, it is certainly desirable that it be made generally known among those who have these subjects in their care, and that it be as generally acted upon for the prevention of such horrible deaths as now so frequently occur.

HENRY B. BAKER.

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 ERRATA.

Page lix, eleventh line from the bottom of the page, for lxxvi read page lxxiii.
 Page 88, nineteenth line of table, for Innes read Imus.
 Page 89, twenty-second line of table, for Innes read Imus.
 Page 115, nineteenth line, for hygienic read hygienic.
 Page 197, line of signature of H. W. Browne, for 1878 read 1877.
 On page 308, and on alternate pages from 308 to 342, the name, Wm. B. Thomas (of
 Ionia, Central Division), should be printed in italics.
 Page 479, Index, line Explosion of a Kerosene Lamp, Accident from, insert refer-
 ence to page 90.

